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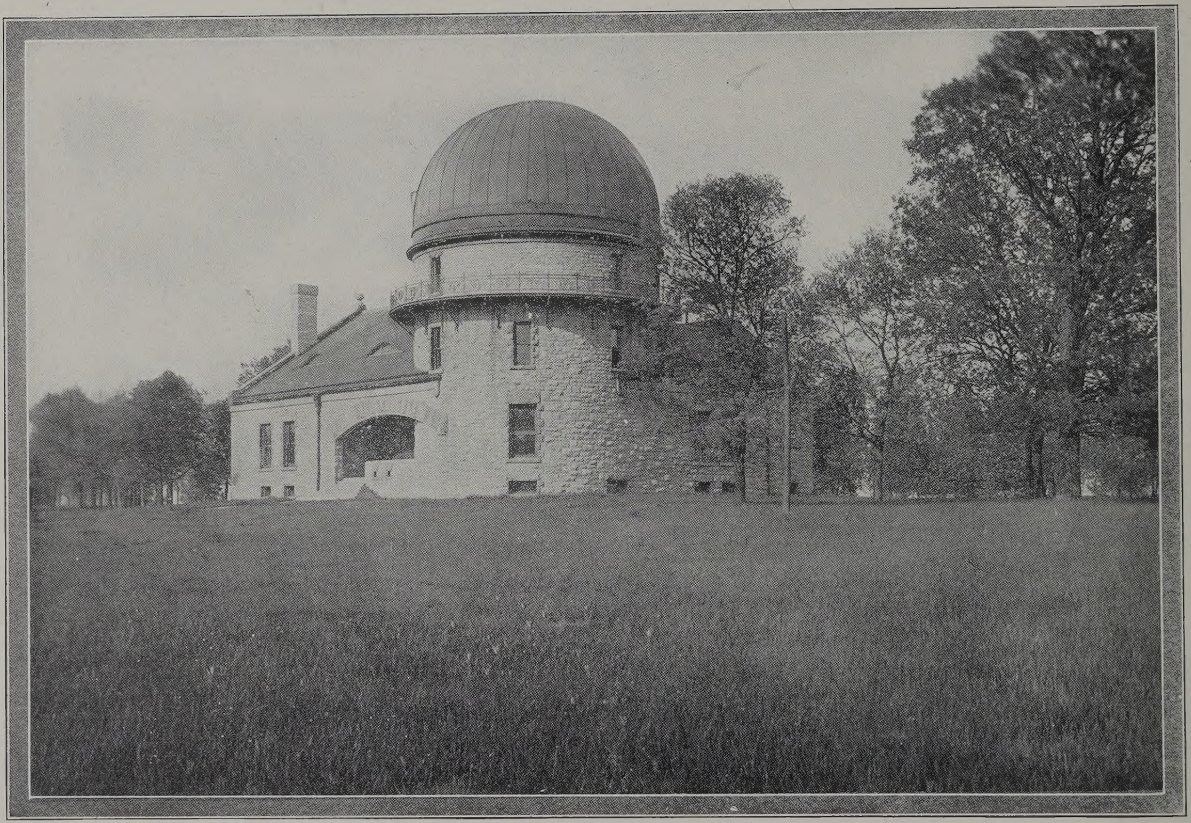
PLATE I.



The Dearborn Observatory of Northwestern University.

ANNALS

OF THE

DEARBORN OBSERVATORY

OF

NORTHWESTERN UNIVERSITY

VOLUME I

EVANSTON, ILLINOIS
1915

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HISTORICAL AND DESCRIPTIVE INTRODUCTION

MEASURES OF DOUBLE STARS

BY

PHILIP FOX

TO

SHERBURNE WESLEY BURNHAM

WHOSE LABORS BROUGHT NEW LIFE TO DOUBLE STAR ASTRONOMY
WHO SPARED NOT HIMSELF IN HIS OFT HEROIC VIGILS
WHOSE PERSONAL ENCOURAGEMENT HAS BEEN
THE DIRECT INSPIRATION FOR THESE
OBSERVATIONS

THIS VOLUME

IS GRATEFULLY INSCRIBED

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GENERAL ACCOUNT OF THE DEARBORN OBSERVATORY.

The Dearborn Observatory was founded by citizens of Chicago by voluntary contributions. These men had confidence in the commercial future of their city and strove to keep her standing in learning abreast of her commercial progress. The foundation of the Observatory and the erection there of a great telescope was one expression of their desire that their city should contribute her share to the results of scientific research.

A complete record of the early operations of this group of citizens, who later organized as the Chicago Astronomical Society, is not available. The official record was destroyed in the great Chicago Fire of October 9, 1871. A fairly comprehensive account was compiled in 1902 by Mr. H. C. Ranney,[1] principally from newspaper files, but in part from the recollections of the members and from letters. From this source and from the Secretary's official record, which is available subsequent to 1874, the material for this brief résumé of the history of the Dearborn Observatory has been gathered.

The movement originated in 1862, when the Reverend M. R. Forey came to Chicago to dispose of a Fitz refractor of 16-inches aperture. He broached the matter of the establishment of an observatory to the University of Chicago[2] and interested its President, Dr. John C. Burroughs, and Albert H. Mixer, Professor of Greek. To further the project Mr. Forey delivered a lecture, "The Sidereal Heavens", at Bryan Hall on December 8, 1862. At the close of the lecture a meeting was held, with Hon. J. Y. Scammon in the chair. After considerable discussion a committee was appointed to take such action as was necessary to found an observatory in Chicago. The personnel of the committee included men prominent in Chicago's affairs: Messrs. J. Y. Scammon, J. H. Woodworth, W. H. Wells, Thomas Hoyne, J. F. Rumsey, E. B. McCagg, C. H. Walker, W. B. Ogden, J. M. Wilson, W. L. Newberry, W. E. Doggett, T. B. Bryan, A. H. Mixer, W. H. Ryder, A. E. Kent, Nathaniel Colver, S. S. Hayes, J. C. Haines, and P. W. Gates.

At a later meeting a plan was submitted for raising money whereby the subscribers were to be entitled to visit the Observatory. A subscription of $100 or more entitled the donor to life membership in the proposed Astronomical Society with a life observation ticket; contributions of less amounts, to privileges at the Observatory for a restricted term of years. It is seen, then, that membership to the Society was put on a purely pecuniary basis. This plan somewhat elaborated appears in the Constitution of the Society adopted at the time of its formal organization. A further provision of the plan was that the Observatory should be established as a part of the University of Chicago.

Quick response met the effort of the committee appointed to solicit subscriptions, whereupon a second committee was appointed, authorized to purchase the telescope. As some doubt had been cast on the merits of the Fitz telescope, characterized as a new and untried type, Professor Mixer was instructed to visit Ann Arbor for consultation with Professor Brünnow before final action should be taken. Incidentally he found Professor C. H. F. Peters of Hamil-

[1] This record is now deposited with the Chicago Historical Society. That the newspaper files should have been able to furnish a fairly connected account is due to Professor Elias Colbert, reporter and, later, editor of one of Chicago's great papers, who from the first took an active interest in the Society and detailed its activities in the press.

[2] It should be borne in mind that all mention of the University of Chicago refers to the original University of Chicago, located in Douglas Park, founded in 1857 and closed in 1886, and not to the present flourishing institution.

ton College there. From Professors Brünnow and Peters he learned of the 18½-inch lens in the shop of Alvan Clark and Sons in Cambridge. This lens had been made upon the order of President F. A. P. Barnard of the University of Mississippi, under the stipulation that it should be equal in size and quality to the greatest objectives then in existence, the 15-inch lenses of the Harvard College Observatory and of Pulkova. The disks cast by Chance and Company of Birmingham, England, were somewhat larger than the size specified. The makers, by sacrificing none of the surplus margin, were enabled to produce an objective of 18¾-inches aperture. This was the first instance in which the Clarks surpassed previous accomplishments as to size of objective. Their later progressive attainments are well known. The breaking out of the War of the Rebellion and the consequent financial stringency had prevented the University of Mississippi from taking the lens. Upon hearing Professor Mixer's report, and not feeling bound to take the Fitz instrument, the Society enlarged the power of the committee to permit of the purchase of any telescope it might see fit, "but to be satisfied with nothing less than an unquestionably first-class instrument." With this authorization the committee decided to take the Clark lens under consideration.

Mr. Thomas Hoyne of the committee left Chicago on January 6, 1863, and reached Boston on the morning of January 10. He went immediately to see Mr. Clark at Cambridge and arrived at what proved to be a critical moment. A campaign for funds for the acquisition of the objective for the Harvard College Observatory had been under way for some time. He learned that the arrangements for the transfer of the telescope to that Observatory were being hurried to completion as Professor Brünnow had warned Professor George Bond, then the Director, of the Chicago movement. What follows is given in Mr. Hoyne's words: "On the morning of the committee's arrival, Mr. Clark had been summoned to Boston to close the negotiations with Professor Bond, and had actually gone to the place appointed. The Committee found a son at the house, saw the objective in the rude pine box, and realizing that something was transpiring which made it of the first importance that what he was to do there must be done quickly, came to business at once by asking for terms. Hearing them, he told Mr. Clark that he and his father need have no further anxiety as he was there to purchase the lens for Chicago and would pay the first installment, $1,500, that day. The surprise of Mr. Clark was expressed in a desire to see his father before he could thankfully accept the purchaser. His interest was secure in favor of the city that did not higgle about price or terms, and he insisted that no incident should deprive Chicago of the priority of right, acquired by being the first actual purchaser. The son and the committee posted back to Boston and found the father before he had seen Mr. Bond. It may seem an exaggeration of the feeling, but nevertheless, it is in full accordance with the truth, that when it was announced that the great lens was sold he felt, as well as expressed, disappointment. He, like Mr. Bond, had set his heart upon the prospect that this latest achievement of his genius, the triumph of his advancing years, was to be kept in Cambridge near his own home. He suggested the economy of taking the Cambridge 15-inch, which might be had on reasonable terms, urged that his friends in Boston who had subscribed for the purchase would feel keen disappointment, but finally conceded to the Chicago committee the prior right as purchaser, and the memorable purchase was made." The purchase price was $11,187.

The acquisition of this lens and the generous offer of Hon. J. Y. Scammon to subscribe the amount of money necessary to build the tower of the Observatory, gave the movement an impetus that carried it to completion. The contract for the mounting was entered into with Messrs. Alvan Clark & Sons, who agreed to deliver an equatorial mounting for the 18½-inch objective to be made according to approved specifications. The contract is dated May 25, 1863, and the contract price was $7,000. At a meeting of the trustees of the University of Chicago on March 20, 1862, Mr. Scammon had called the attention of the Board to the resolution of the subscribers of the Astronomical Society that the foundation of the Observatory should be placed under their charge as a part of the University. The subject of the location of the tower with respect to the proposed main building of the University, as well as the design of the tower, was referred to the architect, Mr. W. W. Boyington. On July 14, 1863, the Trustees adopted the following resolutions:

"*Resolved:* 1. That the Observatory of the Astronomical Society of Chicago be established at the University, and that the same shall constitute a part of said University; but the control and management shall be vested in the directors of said Observatory, who shall be nominated by the members of said association, and confirmed by the board of trustees of the University, saving to all persons who have contributed the sum of $500, their rights as life directors without election.

"2. That in case the members of said association neglect or fail to nominate directors, such directors may be elected by the board of trustees without such nomination. The number of directors, exclusive of life directors, shall never exceed twenty-one, and seven directors shall constitute a quorum for business.

"3. That the building, or additions to the University building, to be erected for the Observatory, shall constitute a part of the property of the University, and be subject to the control of the trustees, saving to the directors of the Observatory the right and authority implied in the foregoing resolutions."

Mr. Boyington prepared his plans for the Observatory tower after visiting various observatories. The work of construction was started in the autumn of 1863 and was completed, including the dome, in October, 1865. In compliance with the wish of Mr. Scammon who bore the entire expense of the erection, the Observatory was named the "Dearborn Observatory", as an expression of his regard for the memory of his deceased wife, whose maiden name was Mary Ann Haven Dearborn.[3] The name was appropriate on other grounds, for the name of Dearborn is intimately associated with the early history of Chicago.

The shipment of the telescope was deferred until the appointment of the astronomer could be made. A further noteworthy addition to the equipment had been made possible by the donation of $5,000 by Mr. Walter S. Gurnee, former mayor of Chicago, for the purchase of a meridian circle. In November, 1865, the Society perfected a permanent organization, adopted a constitution, and prepared a draft of an act of incorporation to be submitted to the legislature. On December 1, 1865 the Society met and elected the following officers: President, Mr. J. Y. Scammon; Vice-President, Mr. W. H. Wells; Secretary, Mr. Thomas Hoyne; Treasurer, Mr. D. J. Ely. Further, they took the important step of calling Mr. Truman H. Safford to be the first Director of the Observatory and Professor of Astronomy in the University. The definite appointment was made on December 28, 1865. On the arrival of Professor Safford the contract was let for the meridian circle. The equatorial was sent to Chicago, arriving on March 25, 1866, and was installed and ready for observing on April 11, 1866. A description of the original observatory need not now be given. The appearance of it and its connection with the University building is well shown in Plate II.

The speedy accomplishment of the various steps of this movement from the purchase of the great lens, within a month of the inception of the project, to the completion, well illustrates the spirit of enterprise of the citizens of Chicago. It should not be forgotten that the whole was accomplished when all business was suffering from the depression caused by the great War of the Rebellion. Nor should it be forgotten "that it was but a scant half century since the first settlement of Chicago, when the chief outlook was for hostile Indians, to the establishment of the Dearborn Observatory and viewing the heavens with the most powerful refractor of the World".[4]

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[3] It is of interest to note that she was a relative of General Henry Dearborn for whom Fort Dearborn was named.

Professor Safford immediately began observing and teaching. At the telescope he devoted himself largely to the nebulae, of which he discovered one hundred and eight. His interest in the nebulae had been aroused probably by his study of Bond's observations on the Orion nebula, which he had prepared for publication,[5] after Bond's death. He had, however, a comprehensive program of observation, as is shown in his various reports to the Chicago Astronomical Society.

The original dome proved to be far from satisfactory. It could be turned only with great exertion, so that Professor Safford was severely restricted in the field of the sky available for study. As this difficulty increased progressively, he was virtually compelled to abandon any observing which necessitated movement of the dome. To get some effective use of the equatorial he began a series of zone observations, similar to those of the Harvard College Observatory, begun by Bond and in which Safford and Coolidge had participated.[6] On this plan he observed about three thousand stars in a southern zone.

In the reports of this time there is frequent mention of his assistants, A. N. Skinner, Ormond Stone, and William A. Metcalf. The activities included an expedition to Des Moines to observe the solar eclipse of August 7, 1869, the determination of the longitude of Pembina, Canada, for the Manitoba Survey, the establishment of standard time service for Chicago, which brought some funds to the Observatory, and the preparation of many papers for presentation to the Chicago Academy of Sciences and publication in the scientific periodicals.

The meridian circle built by Repsold and Sons of Hamburg had now arrived and with its installation, Professor Safford transferred his activity to it. The cost of this instrument including transportation, insurance, duty, etc., was $7,416. The great Astronomische Gesellschaft catalogue project was just being launched and he accepted one zone, declination + 40° to + 45°. He entered immediately and vigorously upon the observation and had completed nearly one-half of the whole task when the Chicago fire of October 9, 1871, prostrated the city and wiped out the resources of the Observatory. From the first, Professor Safford's salary had been paid by Mr. Scammon, but as he was now no longer able to maintain this burden, and as funds for the payment of the salary were not forthcoming from other sources, Professor Safford was given leave of absence for two years that he might turn to a more practical side of astronomy. He entered the Coast and Geodetic Survey of the United States. Professor Elias Colbert, who had been assistant director since September, 1870, continued in charge of the Observatory and maintained the time service. It should be stated that the many services of Professor Colbert toward the welfare of the Observatory and for which the Society is so deeply indebted, were rendered in all cases without remuneration.

The financial panic of 1873 came as Chicago was just beginning to rally from the fire losses. The unendowed Observatory felt the second blow keenly. In the spring of 1874 Professor Colbert made an effort to reawaken interest in the Observatory, looking toward its rehabilitation. One spur to action was found in an article in the *Tribune* for May 4, 1873, which stated: "It seems not very creditable to the Observatory that the great telescope should stand unused, given over to rust and dust, while the novice Burnham is publishing from

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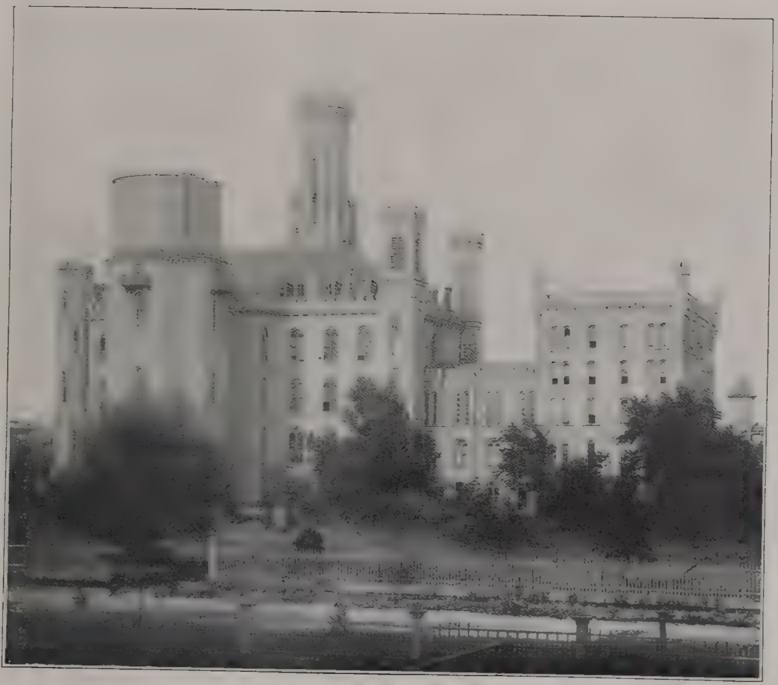
[4] Chicago *Tribune*, April 28, 1866.

[5] Annals of the Harvard College Observatory, Vol. V.

[6] Annals of the Harvard College Observatory, Vols. I, II, VI.

PLATE II.



The Original Dearborn Observatory Tower.

Chicago, lists of new double stars discovered with his 6-inch telescope." At the request of the Society, Mr. R. A. Proctor gave four popular lectures in Kingsbury Music Hall on March 9, 10, 13, and 14, 1874, as the opening skirmish of a campaign to raise funds to build a new dome and to put the telescope again in working order. A call for funds was made to revive the enterprise. The campaign was furthered by Professor Safford who on April 16, 1874, presented a report to the Society reviewing the work on which he had been engaged during his absence. He reviewed the promising record of his former students, Stone, Skinner, Metcalf, Maryatt, and Olson. He recalled to the Society that after having undertaken the observation of the A. G. zone, it had been necessary to announce the suspension of the work, and concluded by making a stirring, impersonal appeal that the work be revived. "If we can accomplish this work, we shall be doing credit to Chicago; and at the same time establishing a fixed standard of Chicago scientific work, which will be known in all future history of Astronomy."

During the year, chiefly through the efforts of Professor Colbert, sufficient money was raised to build a new dome. The order for this was given on March 11, 1875, and it was ready on July 19. In the meantime Mr. Clark had put the telescope again in excellent condition. The rehabilitation of the Observatory was complete and no debt hung over it. The only things lacking were an astronomer and the funds to support him. It should be noted that in April, 1874, Professor Colbert had been appointed Emeritus Director.

At this time the Society was reorganized and a revised constitution was adopted. As this is still in force it is given here in full:

AMENDED CONSTITUTION OF THE CHICAGO ASTRONOMICAL SOCIETY ADOPTED JULY 9, 1875.

ART. I. The object of this Society shall be the same as stated in the Charter of Incorporation passed by the General Assembly of this State, Feb. 19, 1867, to support the Astronomical Society Observatory in Chicago, and diffuse astronomical knowledge.

ART. II. Every person who has subscribed and paid, or may hereafter subscribe and pay, the sum of $100 toward the foundation, support, and maintenance of the Dearborn Observatory shall be considered and be thereby constituted a member of said Society, with the privilege of a visitor to said Observatory during his life, and shall receive a life Observation Ticket for himself and family, not transferable, and that such member be entitled to vote at all elections held for Directors of the Observatory Board at the annual meeting. Every person who shall pay and subscribe any sum over $100 shall, in addition to his right of membership, be entitled to an additional vote for every additional $100 by him subscribed and paid: Provided that in no case shall any person be entitled to cast more than five votes; but in all cases when any person subscribes and pays the sum of $500 he shall be a Life Director.

ART. III. An annual meeting of this Society shall be held on the second Thursday of May in each and every year, of which due notice by publication shall be made in some newspaper, by the Secretary, and a notice thereof mailed to each member at least three days previously; and at the first election, which shall be held immediately after the adoption hereof, there shall be an election held for nine Directors who, together with such persons as shall have become Life Directors by the payment of $500, as aforesaid, shall constitute the Board of Directors, or the executive and Observatory Board of said Association and, as such Executive Board, shall exercise all the powers of such Executive Board and perform all functions with respect to said Observatory and its management, and the care of the property thereof, as the same are specially defined and provided in the 3d section of said Act of Incorporation.

ART. IV. The said nine Directors so to be elected by said Association shall hold office one-third for one year, and one-third for two years, and one-third for three years from the first day of July, A.D., 1875; and at their first regular meeting after the adoption of this Constitution shall cast lots for their respective terms, and annually thereafter. On the second Thursday in May of each year the Society, at the annual meeting, shall elect three Directors to take the place of the three retiring Directors, who shall hold their office for three years, and until their successors are appointed. In case of any vacancy occurring during the year the same

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T. C. Hoag
James B. Hobbs
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H. E. Moss
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C. G. Wicker
J. H. Woodworth

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I. N. Arnold
E. H. Ayers
Jerome Beecher
William Blair
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N. S. Bouton
C. F. Bowen
James Boyd
Clinton Briggs
Jonathan Burr
J. C. Burroughs
J. K. Burtis
J. E. Chapman
Thomas Church
W. L. Church
John Clough
S. B. Cobb
J. G. Conrad
W. F. Coolbaugh*
A. B. Cort
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Isaac C. Day
Thomas Dickerson
H. T. Dickey
C. S. Dole
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E. W. Edwards
W. J. Endicott
W. W. Everts
J. C. Fargo
J. V. Farwell
Marshall Field
J. S. Flint
C. Follansbee
John Forsythe*
Thomas Foster
S. W. Fuller
D. A. Gage
George W. Gage
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A. H. Miller
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H. S. Powers
B. W. Raymond
W. H. Rice
W. [illegible]
G. F. Rumsey
J. S. Rumsey
J. [illegible] Rutter
J. T. Ryerson

H. H. Shufeldt
L. B. Sidway
M. B. Smith
J. Spalding
M. C. Stearns
H. O. Stone
A. D. Titsworth
John B. Turner
W. H. Turner
F. Tuttle
Nelson Tuttle
J. E. Tyler
J. Van Etta

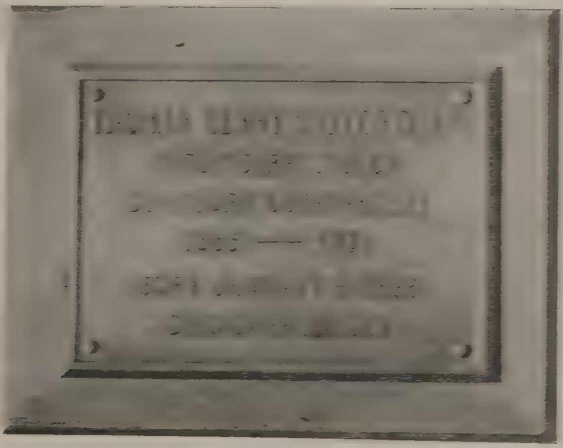
J. M. Van Osdell
Philip Wadsworth
C. C. Waite
W. H. Waite
C. H. Walker
Charles Walker
George C. Walker
S. J. Walker
Robert Warren
Hiram Wheeler
P. H. Willard
P. L. Yoe

George Armour
P. D. Armour
Isaac N. Ash
William T. Baker
Perkins Bass
C. J. Blair
C. W. [illegible]
G. P. Comstock
C. E. Culver
R. L. Dame
J. H. Dwight
F. A. Eastman
N. K. Fairbank
D. F. Gates

H. Greenebaum
H. N. Hibbard
D. A. Jones
Adam Killian
William Kirkwood
L. Z. Leiter
J. B. Lyon
C. A. Mair
W. E. McHenry
Sydney Myers
Murry Nelson
Daniel O'Hara
C. W. Partridge
C. W. Parker

D. K. Pearsons
F. W. Peck
J. S. Peirounet
Norman B. Ream
Charles H. Reed
Henry C. Rew
W. C. Seipp
James Seymour
H. Spruance
C. H. Taylor
Daniel Thompson
Geo. Watson
Horace White
John Wilkinson

To this list of members should be added Elias Colbert, S. W. Burnham, T. H. Safford, W. W. Boyington, Carter H. Harrison, G. W. Hough, A. W. Harris, Henry Crew, Philip Fox, and Thomas F. Holgate, who have been elected Honorary Life Members.



In December, 1875, the Observatory resumed the time service, supplying time to the Board of Trade, to the Elgin Watch Company, and others. This brought to the Observatory about $500 a year. The campaign to raise an endowment fund did not net a sufficient amount to afford the employment of an astronomer. As the outlook was not very promising, Professor Safford accepted in 1876, the Field Memorial Professorship of Astronomy in Williams College. There he remained actively teaching until his death on June 18, 1901.

On November 6, 1912, at a meeting of the Chicago Astronomical Society to celebrate its semi-centennial, a tablet was erected in Professor Safford's honor. On that occasion the prevailing note was of sincere regret that the Chicago fire with the consequent financial distress should have robbed the Dearborn Observatory of his services, and his brilliant intellect of the opportunity to come to full fruition.

On September 20, 1876, S. W. Burnham was appointed Acting Director of the Dearborn Observatory, to serve without pay and under the supervision and direction of the Executive Committee of the Chicago Astronomical Society. He began immediately a series of observations of double stars, continuing the remarkable work which he had accomplished with his own 6-inch refractor. Though he served but three months as acting director, he continued at intervals his observing; and the published records of his work constituted the chief claim of the Dearborn Observatory to fruitfulness prior to the work of his successor, Professor G. W. Hough.

Following the retirement of Mr. Burnham, Professor Colbert again assumed supervision of the Observatory. At this time also, and in fact since the departure of Professor Safford in 1873, Professor Colbert gave instruction in Astronomy in the University. Others who took part in the observing at different times were Professor C. A. Kenaston of Ripon College, G. W. Hough, and George P. Barton. The Observatory sent a party to Denver to observe the eclipse of July 29, 1878. The personnel of the party, under the leadership of Professor Colbert, was G. W. Hough, Lewis Swift, A. C. Thomas, and Professors Easterday and Tressler of Carthage, Illinois.

Professor Colbert resigned from the supervision on May 3, 1879, and on May 6, Mr. G. W. Hough was appointed Director. Though he entered at once upon his observing, it was not until 1881 that the Society, by consummating an agreement to furnish clock-time control to the Fire Alarm Telegraph of the City of Chicago, was able to pay him a suitable regular salary.

In 1881 the University of Chicago, after several years of financial embarrassment, became involved in litigation over its property. On June 15, 1881, The Mutual Life Insurance Company proceeded in the United States Circuit Court to foreclose the mortgage made by the University of Chicago to this company upon premises including the site of the Dearborn Observatory tower and meridian circle building. The action clearly and lawfully involved the Dearborn Observatory tower, as by the original agreement (p. 3) with the University these buildings and additions were a part of the University, subject to the control of the trustees. The action for a time seemed seriously to menace the title to the observing instruments. It was only after a rehearing, on January 16, 1886, that Judge Blodgett rendered an amended decision,[7] whereby the telescope and mounting, dome and circular track, meridian circle and house, books and clocks, were declared to be the property of the Chicago Astronomical Society and within its disposition; but that the tower and real estate were the property of the University of Chicago, and therefore subject to the terms of the mortgage in process of foreclosure.

Through all this uncertainty the time service arrangement with the city and Board of Trade was maintained and the Observatory was enabled to continue its activity. On July 14, 1887, the Society was served with notice to vacate the property by October 1, and though President Burroughs spoke hopefully for the revival of the University and the probable perma-

[7] U. S. District Court, N. D. of Ill., Chicago Astronomical Society vs. Union Mutual Life Insurance Company, No. 17593, Term No. 245, January 16, 1886.

nency of the Dearborn Observatory on the old site, the Directors of the Society realized that they must make a decision as to the future home of the Observatory.

Following the court decision communications came from various sources offering sites or buildings for the Observatory. The final choice was between Northwestern University and Lake Forest University. On August 10, 1887, the vote of the board gave a majority to Northwestern University, and the President and Secretary were requested to execute the agreement. The agreement drawn at that time and still in force, and essentially the same as that entered into with the University of Chicago at the time of the foundation of the Observatory, is given below:

Contract between Northwestern University and the Chicago Astronomical Society.

Whereas, the Chicago Astronomical Society, by reason of the failure of the University of Chicago to maintain its existence as an institution of learning in Chicago, and the loss of its campus and buildings under foreclosure of mortgage, has been released from its obligation to the said University of Chicago, and is required to remove its Observatory, telescopes and other appliances and property from said campus; and

Whereas, The Trustees of the Northwestern University of Evanston, in the county of Cook and State of Illinois have made a proposition to said Society to remove and place said Observatory and instruments upon the grounds of said Northwestern University, and for this purpose to set apart a suitable plat of ground for the uses of said Society, and to erect thereon and maintain at the expense of said last-named University, in perpetuity, Observatory buildings suited to the uses of said Society, with all necessary connections and appliances, and with appropriate and suitable provisions for the residence of the Director of the Observatory and his family, and to give such Director the title of Professor of Astronomy in said University—suitable provision to be made by the Astronomical Society, while retaining its autonomy and distinct corporate rights and authority, for an actual connection with said University, as a part of its educational establishment, the entire expense of this arrangement to be borne by said Northwestern University; and

Whereas, Said Society has accepted said proposition, it is, therefore, agreed as follows:

Agreement: The Chicago Astronomical Society, first party, Northwestern University, second party.

Whereas, It has become necessary to remove from their present location the telescopes, meridian circle, clocks, library, and other observatory appliances, belonging to the first party, and

Whereas, The second party has offered to erect the necessary tower and building or buildings upon its land in the village of Evanston, Cook County, Illinois, for the proper accommodation of said Society and use of said telescopes, library, implements, and appliances, upon the terms and conditions, and to maintain and provide for and use the same for the purposes and in the manner hereinafter set forth;

Now, *Therefore*, This agreement witnesseth, that the parties hereto have and do hereby promise and agree as follows:

First, The second party agrees to erect and finish, upon land which it shall own, the suitable building or buildings, as aforesaid, including a tower for the telescopes, the dimensions, plans, materials, cost, and location thereof to be determined by a committee appointed by and on behalf of said first party, and a committee appointed by and on behalf of the said second party.

Second, The second party agrees to take and remove from their present location said telescopes and other instruments, implements, and appliances, with their appurtenances, and said library, and carefully store, care for, and insure the same in the name of the Chicago Astronomical Society, and place and adjust the same in said tower and building or buildings to be erected as aforesaid, the same to be done by and under the supervision of such person or persons as may be agreed upon by the two committees provided for in item first, above, all to be at the expense of the said second party.

Third, The first party agrees to appoint a committee for the purpose, and with the power to carry out the provisions of items first and second, and agrees that the second party may take and remove and store the property aforesaid belonging to said Society, and place and adjust the same in the tower of building or buildings to be erected, all as provided in item second.

Fourth, It is mutually agreed that the title to the telescopes, meridian circles, clocks, library, and other observatory appliances herein referred to, and which now belong to said first party, shall be and remain in said first party, subject, however, to the provisions hereof, and that the tower and buildings herein provided to be erected shall be and remain the property of the said second party, subject to the provisions hereof, and their use in perpetuity by said Astronomical Society.

Fifth, It is also mutually agreed, that the tower and building or buildings to be erected as aforesaid, together with said Society and telescopes, meridian circle, and appliances, shall constitute a part of said Northwestern University and be a department thereof, and that the same shall hereafter and perpetually be known and designated as Dearborn Observatory of the Northwestern University.

Sixth, It is also mutually agreed that the use and management of said telescopes, instruments, and astronomical instruments and appliances in the interest and for the advancement of science, shall be by and under the direction of a competent astronomer, to be known as the Astronomical Director of said Society and of said University, and whose salary shall be paid by the second party. Said Astronomical Director shall be nominated by the directors of said first party and confirmed by the Trustees, or Executive Committee of said second party, and in case of failure of said first party to nominate within thirty days after it or said Society shall be requested by said Trustees to make such nomination, said Trustees or its Executive Committee may make the appointment without such nomination, and any vacancy in the office or place of Astronomical Director, caused by death, removal, resignation, or otherwise, shall be filled as above provided.

The present Director of said Observatory is retained in office until otherwise agreed between the parties hereto.

Seventh, It is also mutually agreed that any and all moneys earned by said instruments, or hereafter paid by any persons as contributors to said Astronomical Society, shall be paid to said second party, for the uses of said Observatory and its work, and shall be paid out by said second party in and about, and for the uses, purposes, and expenses of said Observatory and the erection and maintenance and support of the same, and of said Astronomical Director, and other employees of said Society and its transactions, or in such manner as shall be directed by the donor or donors thereof. And further, that any person who shall contribute the sum of five hundred dollars to said Astronomical Society, with its assent, shall thereby become a life director of the same, and that all persons chosen or elected directors of said Society shall be such persons, and only such persons as shall have contributed at least the sum of one hundred dollars to said Society; and that the number of directors, exclusive of life directors, shall never be more than twenty-one, and that the number of directors of said Society necessary to constitute a quorum for the transaction of business shall never be less than seven, provided that the unanimous action of five directors shall be as valid as if a quorum were present.

Eighth, It is further mutually understood and agreed that this agreement, and each and every of the provisions hereof, shall be in full force and effect, and binding upon the parties hereto in perpetuity; provided, however, and it is expressly understood and agreed, that in case said Society shall cease at any time to have at least seven directors, by reason of the death of life directors and contributors, or otherwise, that then, and in that case, the vacancies in the office of directors may be filled by appointment by the Trustees of the Northwestern University.

The following resolutions, which were substantially the basis of the connection of the said Society with the University of Chicago, are hereby made applicable to its connection with the Northwestern University:

Resolved, That the Observatory of the Chicago Astronomical Society be established at the University, and that the same shall constitute a part of the said University, but the control and management of the same shall be vested in the directors of the said Observatory, who shall be nominated by the directors of the said Society, and confirmed by the Board of Trustees of the University, saving to all persons who have contributed five hundred dollars the right of life directors without election.

Resolved, That in case the directors of said Society neglect or fail to nominate directors, said directors may be appointed by the Board of Trustees of the University without such nomination. The number of directors, exclusive of life directors, shall never exceed twenty-one, and seven directors shall constitute a quorum for the transaction of business.

Resolved, That the buildings or additions to the University to be erected for said Observatory shall constitute a part of the property of the University and be subject to the control of the Trustees, saving to the directors of the Observatory and of the Astronomical Society the rights and authority implied in the foregoing resolutions and in this agreement.

In witness of all which the said Chicago Astronomical Society has caused the President and Secretary of said Society to hereunto sign their names, and has affixed hereto its corporate seal.

And the Trustees of the Northwestern University, at Evanston, aforesaid, have caused the President and Secretary of their board to sign the same and affix the corporate seal of the said University.

Done at Chicago, this 29th day of October in the year of our Lord, one thousand eight hundred and eighty-seven.

H. A. JOHNSON,
President of the Chicago Astronomical Society.
HENRY C. RANNEY,
Secretary of the Chicago Astronomical Society.
NORTHWESTERN UNIVERSITY,
By ORRINGTON LUNT,
Vice-President.

Attest,
JAMES G. HAMILTON,
Secretary of Northwestern University.

The new Dearborn Observatory, for which the corner stone was laid on June 21, 1888, was the gift of Mr. James B. Hobbs of Chicago, and since 1883 a trustee of Northwestern University.[8] The plans were prepared by Cobb and Frost, architects, under the supervision of the joint building committees of the University and the Society: President Joseph Cummings, Messrs. J. B. Hobbs, J. Y. Scammon, and Elias Colbert. The entire cost of construction was $25,000. The exercises of dedication were held on June 9, 1889; the orators of the occasion were Mr. E. B. McCagg and Dr. H. A. Johnson. On September 1st the observatory was in working order. As bearing on the oft heard query concerning the influence of proximity of a large body of water on observing conditions, it should be stated that the Observatory is less than one hundred metres from the shore of that great, fresh-water lake, Lake Michigan, and about ten metres above its surface.

Plate I and the cut of the ground floor, Fig. 1, show the general style of the building and the arrangement of rooms. The building faces to the west. It measures 81 feet from north to south, and the greatest width is 72 feet. It is constructed of rubble limestone and trimmed with dressed Bedford stone; the roof is red tile. There is a basement under the entire building which provides for shops and store-room, and until recently for furnace and coal bins. The building is now heated by steam from the central power plant which lies a kilometer to the south. The main hallway divides the observing section of the building from the office rooms. On the south are the tower for the equatorial, the meridian circle room, and one office, which contains also the overflow from the library. The library, which numbers about 2,200 bound volumes and 4,000 unbound pieces, and includes the principal astronomical periodicals and observatory publications, is in the center of the north half of the building. To the west of it are the Director's offices and to the east, three rooms used for offices and instrument cabinets. On the second floor, over the library, is a classroom. On either side of this, over the two rows of offices, are rooms which serve respectively as photographic dark room and living room for the caretaker. The observing room for the equatorial is on the third floor.

Surmounting the cylindrical tower is the revolving dome which measures 34 feet in diameter in the clear. The success of this most essential feature of the observatory building is due entirely to Professor Hough. At the time of its construction the dome presented some novel features. As smooth running domes are no longer a rarity, only a word of description is here necessary.[9] It is made entirely of steel and iron, with a heavy cast iron base, on the under side of which is the track. The ribs are of light angle iron; the covering is galvanized iron plate with no sheathing of wood. The weight of the dome is about ten tons. It rests upon sixteen fixed wheels mounted upon the top of the tower. This arrangement is very satisfactory, but the inverted form adopted later by Warner and Swasey in their dome-running gears, in which the track is mounted on the tower and the wheels are bolted to the dome, is probably preferable. Eight guide wheels pressing against the inner edge of the track prevent lateral displacement. The dome is driven by rack and pinion, the pinion being fixed on the tower, and the rack being mounted on the heavy cast iron base ring of the dome. The motion formerly was given to this pinion by a hand-turned crank near the floor. In recent years an electric motor has been applied. The opening in the dome is four feet wide, and extends from the horizon to two feet beyond the zenith. The shutter extends over the whole hemisphere. It is pivoted at the back and has rollers at the side of the opening; otherwise it has no connection with the dome. It is operated by an endless cable from the interior of the dome.

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[8] Deceased, August 13, 1914.

[9] See *Sidereal Messenger*, 8, 341, 1889.

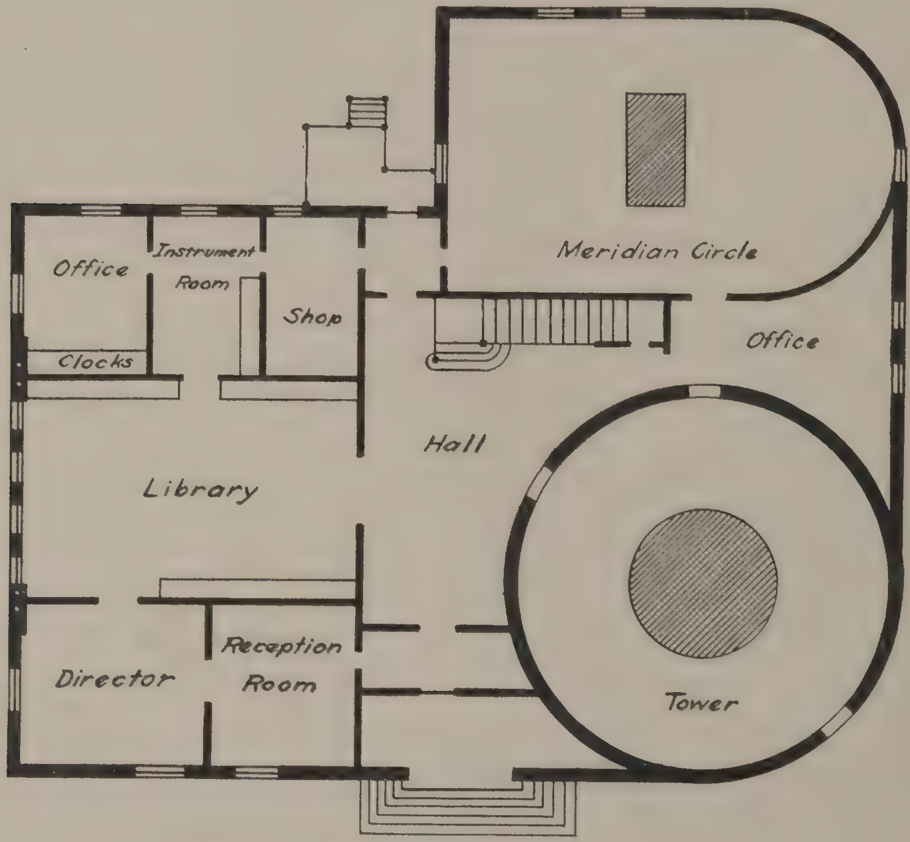
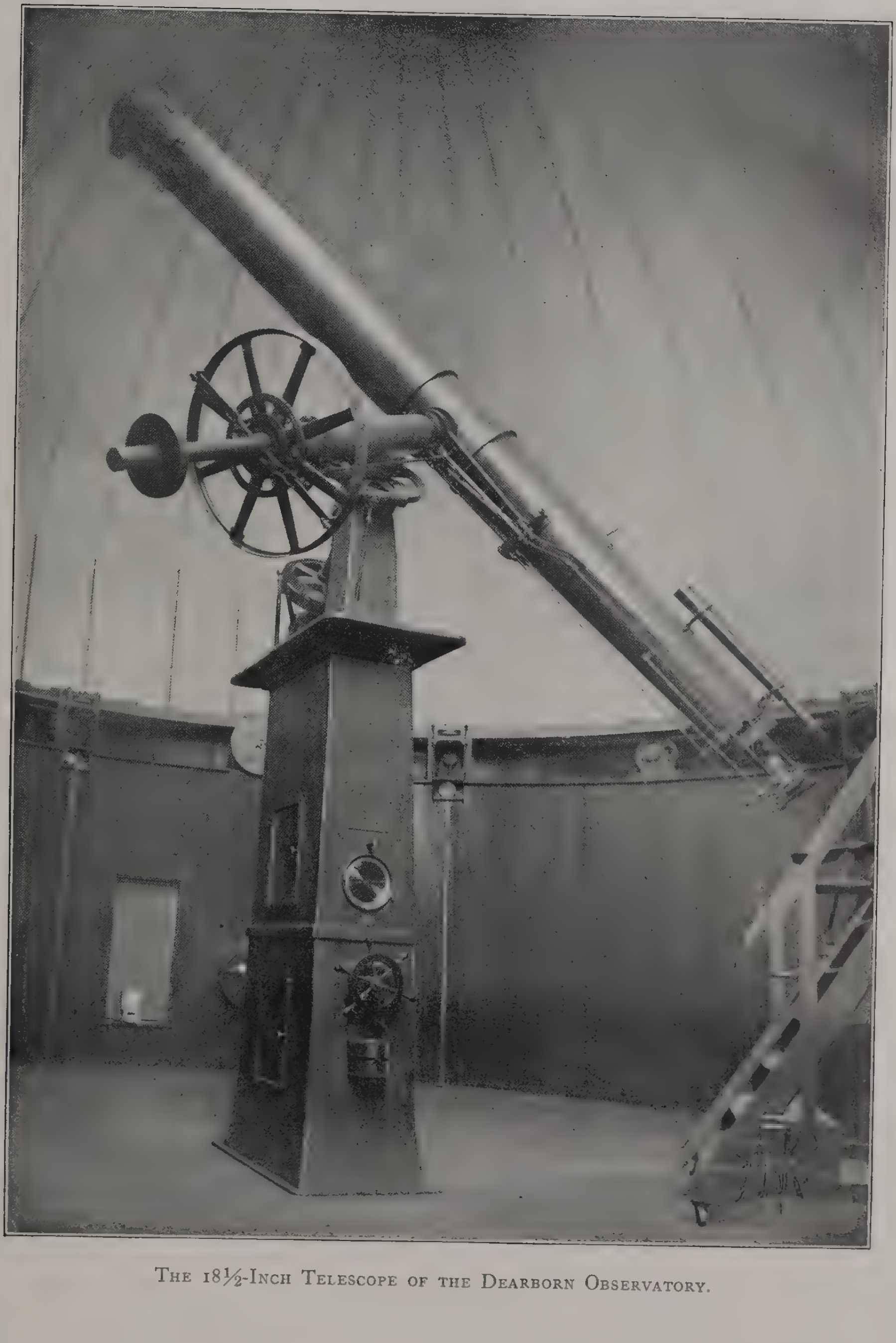


Fig. 1.

The mounting of the equatorial in use until the spring of 1911 was that set up in the original Dearborn Observatory. Its wooden tube and poor driving clock rendered it quite unsuitable for a general program of observation. At the date mentioned the telescope was completely remounted by Warner and Swasey, Plate III. In the new mounting, provision is made for the convenient attachment of various accessory apparatus, the plate holder, spectrograph, etc. At the present time the instrument gives entire satisfaction. The telescope is carried on a brick pier which is independent of the building. The base of this is a concrete block fifteen feet below the ground level. The soil is sand and gravel. The pier tapers from

PLATE III.

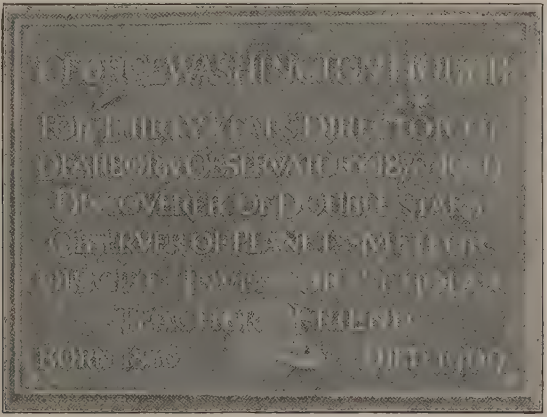


THE 18½-INCH TELESCOPE OF THE DEARBORN OBSERVATORY.

a diameter of fifteen feet at the base to ten feet at the top. It is surmounted by a stone slab, to which the telescope is anchored.

The mounting of the meridian circle has been described by Professor Hough in the *Astronomische Nachrichten*, No. 3902, where he gives the results of careful investigation on the variation of the adjustments of the instrument with varying temperature.

The investigations made in the new Dearborn Observatory by Professor G. W. Hough have been published for the most part in the *Reports* of the Chicago Astronomical Society, in the *Astronomische Nachrichten*, the *Astronomical Journal*, *Monthly Notices*, and *Popular Astronomy*, and consist of observations of comets and difficult double stars; the physical observations of the planets, and more especially of Jupiter; the various satellite systems, including measures of such difficult objects as the four moons of Uranus; occultations of stars by the Moon, etc. Throughout all the years, time service has been conducted. Professor Hough remained in charge of the work of the Observatory and conducted the instruction in astronomy until his death on January 1, 1909. The tablet erected in the Observatory by the Chicago Astronomical Society commemorates his service.



During the interim until the appointment of the present Director on September 1, 1909, Professor Malcolm McNeill, of Lake Forest University, was in charge of the Observatory and conducted the instruction.

This volume gives the principal results of observations during the first three years of the present directorship.

INVESTIGATION OF THE 18½-INCH OBJECTIVE.

The excellence of this objective is well established by the long list of difficult double-stars which have been discovered and observed with it. There is no better evidence of quality than that of actual accomplishment. The application of the Hartmann test to it is therefore of peculiar interest, as the investigation constitutes not only a test of the objective, but in a way a test of the Hartmann method.

The zone plate had ninety-six apertures arranged at the corners of squares on twenty-four different zones. The apertures were 12 mm in diameter; one, at the arbitrary zero of position angle, was of 16 mm diameter. The arrangement of holes is seen in the actual extra-focal photographs, Fig. 2. The images for 0° may be easily identified. For each of the twenty-four zones the focal-length was determined in two planes perpendicular to each other. In practice the screen was in general mounted on the cell of the objective with the arbitrary 0°

of the screen at the bottom of the cell when the telescope was on the west side of the pier and pointed toward the south. The readings for the various position angles, as referring to positions on the objective, are not directly comparable. In September, 1912, a date intermediate in the series, the lenses were removed from the cell and cleaned. No effort was made to replace them in the previous position in the cell. It was the custom of the Clarks to mark the elements of their lenses on the edge so that their original orientation with respect to each other might be preserved. Their system of local correction required that the relative position of the lenses when figured, should be maintained. It should be stated that on the date mentioned the lenses were found in maladjustment in this regard, and in replacing them the correct orientation was restored. Another reason for the impossibility of directly comparing results for various angles is that the zone plate was rotated 45° between the two sets made on February 4, 1913. These things affect the direct intercomparison of individual zone results but more especially the results for astigmatism.

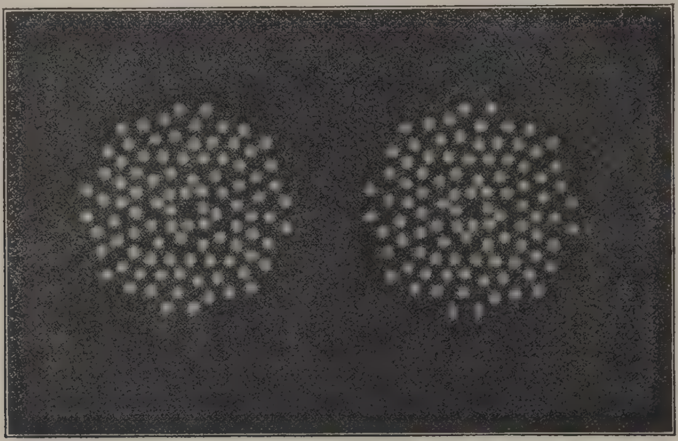


FIG. 2. Out-of-Focus Images for the Zonal Foci Test.

During the exposures the telescope was guided, using for this purpose the long-focus finder (f = 670 cm). The telescope was moved with the slow motions when necessary. The images in all the plates measured were very good. For each set the two exposures, one inside the focus, the other outside, are on a single plate. The photographic plate for the two extra-focal exposures was set about 125 mm inside and then outside of the focal plane, except in the first pair of plates where the two settings were not equidistant from the focus, being 114 mm inside and 156 mm outside.

The results from the different plates are given in Table I. The first column gives the zonal radius, the second the position angle from the arbitrary zero, the succeeding five columns give the focal-scale readings of the various zones for the five plates, and columns 8 and following give the mean of these determinations in the two perpendicular planes. These results are shown graphically in Fig. 3. The curves are very smooth, quite free from those abnormal zones seen in the 40-inch objective of the Yerkes Observatory, and the 80-cm at Potsdam. It does show, however, somewhat shorter focal-length at the center and edge than in the intermediate zones. One rather astonishing result is apparent and that is that the focal-setting remains practically constant throughout a wide range of temperature. This had been noted previously in visual work, and for all subsequent photographic work we have used a constant focal-setting, a great convenience.

TABLE I.

Zone	Angle	O_{14}	O_{15}	O_{16}	O_{20}	O_{21}	O_{14}	O_{15}	O_{16}	O_{20}	O_{21}
mm		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
226	55°	294.09	294.91	293.87	294.72	295.06	293.90	294.69	293.65	294.82	295.04
	145	293.70	294.47	293.43	294.92	295.02					
222	15	294.25	295.02	294.05	295.15	295.07	294.18	294.77	294.08	295.04	295.14
	105	294.11	294.52	294.11	294.94	295.21					
218	0	294.25	294.97	294.08	295.15	295.07	294.19	294.83	294.10	295.02	295.08
	90	294.12	294.69	294.11	294.89	295.10					
212	40	294.45	294.98	294.62	295.15	295.32	294.59	295.05	294.49	295.12	295.30
	130	294.73	295.12	294.36	295.10	295.28					
206	67.5	294.58	294.97	294.97	295.32	295.25	294.76	295.29	294.79	295.38	295.35
	157.5	294.94	295.62	294.61	295.44	295.46					
200	80	295.03	295.19	294.77	295.39	295.20	294.96	295.22	294.76	295.33	295.26
	170	294.90	295.28	294.75	295.28	295.32					
194	27.5	294.89	295.09	295.13	295.57	295.33	295.06	295.34	294.88	295.37	295.31
	117.5	295.23	295.59	294.63	295.17	295.30					
188	52.5	295.14	295.39	295.19	295.45	295.42	295.32	295.35	295.08	295.46	295.44
	142.5	295.50	295.31	294.97	295.47	295.47					
182	10	295.14	295.48	295.27	295.73	295.67	295.30	295.50	295.11	295.52	295.62
	100	295.46	295.52	294.96	295.32	295.57					
174	40	295.25	295.56	295.57	295.88	295.43	295.60	295.73	295.38	295.77	295.59
	130	295.94	295.91	295.20	295.67	295.76					
166	70	295.54	295.54	295.53	295.44	295.47	295.62	295.61	295.47	295.54	295.71
	160	295.71	295.68	295.41	295.64	295.95					
160	85	295.95	295.92	295.64	295.60	295.41	295.73	295.80	295.56	295.67	295.50
	175	295.51	295.69	295.48	295.74	295.59					
154	25	295.57	295.76	295.93	295.88	295.64	295.80	295.84	295.60	295.56	295.67
	115	296.03	295.93	295.27	295.24	295.70					
148	55	295.59	295.93	295.76	296.12	295.39	295.70	295.97	295.54	295.90	295.74
	145	295.80	296.01	295.32	295.69	296.09					
142	10	295.74	296.05	295.86	296.02	296.10	296.06	296.04	295.78	295.93	295.89
	100	296.38	296.04	295.70	295.85	295.68					
134	40	295.88	295.85	295.88	296.01	295.81	296.09	295.87	295.82	295.79	295.87
	130	296.30	295.90	295.76	295.58	295.94					
125	70	296.10	295.77	295.49	295.62	295.53	296.00	295.73	295.77	295.69	295.83
	160	295.91	295.69	296.06	295.76	296.13					
115	22.5	295.98	296.06	296.05	296.15	295.95	296.23	295.90	295.80	295.86	295.81
	112.5	296.48	295.75	295.56	295.57	295.67					
110	0	296.05	296.01	295.78	295.85	295.28	296.03	296.15	295.74	295.63	295.47
	90	296.02	296.29	295.70	295.42	295.66					
95	45	295.78	295.97	296.04	295.95	295.79	296.13	296.24	295.84	295.80	295.89
	135	296.48	296.51	295.65	295.65	296.00					
85	70	296.49	296.61	295.81	296.36	295.83	296.71	296.61	295.81	295.87	295.85
	160	296.94	296.61	295.81	295.39	295.88					
65	15	297.03	296.14	296.66	295.84	296.14	296.92	296.22	296.35	295.62	295.96
	105	296.81	296.31	296.05	295.41	295.78					
50	45	295.46	295.53	295.85	294.39	294.71	295.65	295.44	295.51	294.92	294.99
	135	295.85	295.35	295.17	295.46	295.28					
35	0	295.14	295.63	295.05	294.39	294.50	295.30	295.39	294.95	294.09	294.67
	90	295.46	295.16	294.85	293.79	294.85					

The values given in Table I have been used to derive Hartmann's criterion "*T*", defined as the weighted mean diameter expressed in hundred-thousandths of the focal-length, of the cones of light from the various zones, in that plane, F_0, where the circle of light containing all the converging pencils is smallest. In the "Investigation of the 40-Inch Objective of the Yerkes Observatory"[10] it was shown that the location of this plane, F_0, might depend on one abnormal zone and an alternative was suggested, that F_0 be chosen as that plane where the sum of the weighted diameters of the cones [*rd*] is a minimum. In Table II are given the values of F_0 as defined by Hartmann and by Fox, and the number *T* derived from the zonal-readings, using the different values of F_0. This objective is free from freak zones so that the two values of F_0 are in very close agreement and consequently also the values of *T*.

The marked difference in the value of *T* in the first three tests from those in the last two is probably mainly due to the restoration of the proper relative adjustment of the two elements of the lens or to the type of star furnishing the images. It was pointed out on page 13 that between the first three and last two sets the lenses were cleaned and again properly oriented.

[10] *Astrophysical Journal*, **27**, 237, 1908.

This may well be the most potent reason for the better showing of the later tests, which probably more truly represent the quality of the lens. For a visually corrected objective, where the use of a color-screen is necessary, the observations should be confined to stars of the solar type. For first-type stars the color-filter may serve less satisfactorily as a screen against the concentrated blue light of the image outside the focus. This precaution was complied with only in the last two plates, Table II, in which Arcturus was used, Vega being used in the other cases. The exposures on Vega for *O* 15 were made when there was a fog so dense that ϵ and ζ Lyræ were scarcely visible to the naked eye. The blue light must then have been considerably less effective, and consequently the star gave results more like those from Arcturus. The low value of T from this plate gives additional indication that the difference in T may be due at least in part to difference in spectrum type. There seems to be no relation

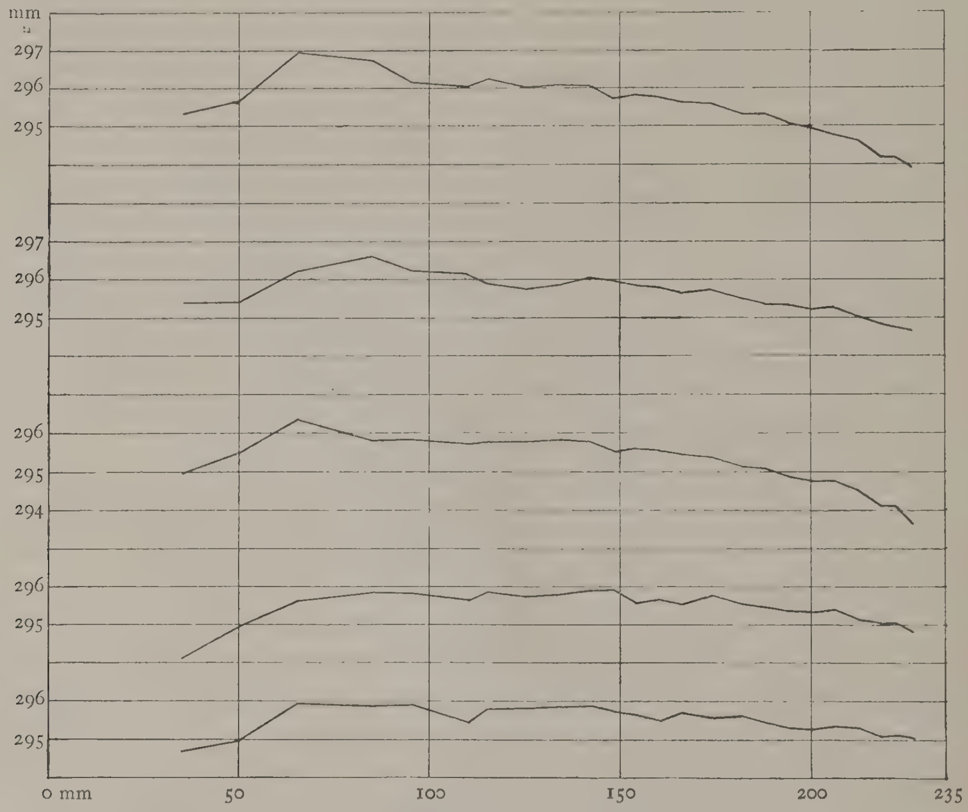


Fig. 3. Zonal Foci of the 18½-Inch Objective of the Dearborn Observatory.

Table II.

Plate Number	Date	Star	Exposure	Zenith Distance	Temperature	F_0		T	
						Hartmann	Fox	Hartmann	Fox
			m			mm	mm		
O 14	July 9, 1912	Vega	20–20	6° 7′	26° C	294.73	295.10	0.48	0.44
O 15	July 9, 1912	Vega	20–27	11 21	26	295.21	295.35	0.28	0.26
O 16	Aug. 20, 1912	Vega	20–20	23 54	22	294.47	294.90	0.48	0.40
O 20[1]	Feb. 4, 1913	Arcturus	10–10	35 41	− 19	295.25	295.40	0.21	0.19
O 21[1]	Feb. 4, 1913	Arcturus	10–10	22 21	− 19	295.37	295.37	0.14	0.14

[1] After cleaning and readjusting the lenses.

between T and the zenith distance, but the smaller values for the two tests using Arcturus may possibly be a temperature effect, for it is seen that the tests were made at a temperature differing by 45° C from that of the tests on Vega.

There are still some objections to be raised against the method of determining the criterion T, especially when we use it to compare different objectives. One has been pointed out by Stetson,[11] who suggests that the resolving power of the objective should in some way be considered. Another difficulty enters through the random choice of zones. Some investigators have spaced the zones nearly equidistantly. Others, accepting the opportunity offered by the space available on the zone plate, have inserted as many apertures as possible, which gives results from widely spaced zones near the center of the lens and closely packed zones near the edge. The edge, therefore, has been given excessive weight. To overcome the objection from this source, investigators should either space the zones according to some accepted plan, or, since this is not feasible, should draw a smooth curve through their zonal-foci readings and choose points on this curve according to an accepted plan. The general trend of the platted zonal-foci readings gives perhaps as good an indication of the relative quality as does the numerical value of T. No attempt has been made in the present observations to select times when the temperature was invariable. Further, it was found that the images on some of the plates are not uniform in intensity but show decided reticular structure. This peculiarity probably arises from the fact that the holes in the zonal-plate were too small, and under conditions of good seeing the diffraction patterns were strong enough to have appreciable effect. The tests should perhaps be repeated with a zonal screen having larger apertures, to see if herein lies the cause of this peculiarity.

TABLE III.

ASTIGMATIC ERRORS.

Zone	Angle	O_{14}	O_{15}	O_{16}	O_{20}	O_{21}
mm		mm	mm	mm	mm	mm
226	55°	+ 0.19	+ 0.22	+ 0.22	− 0.10	− 0.02
222	15	+ 0.07	+ 0.25	− 0.03	+ 0.11	− 0.07
218	0	+ 0.06	+ 0.14	− 0.02	+ 0.13	− 0.01
212	40	− 0.14	− 0.07	+ 0.13	+ 0.03	+ 0.02
206	67.5	− 0.18	− 0.32	+ 0.18	− 0.06	+ 0.10
200	80	+ 0.07	− 0.04	+ 0.01	+ 0.06	+ 0.06
194	27.5	− 0.17	− 0.25	+ 0.25	+ 0.20	+ 0.02
188	52.5	− 0.18	+ 0.04	+ 0.11	− 0.01	+ 0.02
182	10	− 0.16	− 0.02	+ 0.16	+ 0.21	+ 0.05
174	40	− 0.35	− 0.17	+ 0.19	+ 0.11	− 0.16
166	70	− 0.08	− 0.07	+ 0.06	− 0.10	+ 0.24
160	85	+ 0.22	+ 0.12	+ 0.08	− 0.17	+ 0.09
154	25	− 0.23	− 0.08	+ 0.33	+ 0.32	− 0.03
148	55	− 0.11	− 0.04	+ 0.22	+ 0.22	+ 0.35
142	10	− 0.32	+ 0.01	+ 0.08	+ 0.09	+ 0.21
134	40	− 0.21	− 0.02	+ 0.06	+ 0.22	− 0.06
125	70	+ 0.10	+ 0.04	− 0.28	− 0.07	+ 0.30
115	22.5	− 0.25	+ 0.16	+ 0.25	+ 0.29	+ 0.14
110	0	+ 0.02	− 0.14	+ 0.04	+ 0.22	− 0.19
95	45	− 0.35	− 0.27	+ 0.20	+ 0.15	+ 0.10
85	70	− 0.22	0.00	0.00	+ 0.49	+ 0.02
65	15	+ 0.11	− 0.08	+ 0.31	+ 0.22	+ 0.18
50	45	− 0.19	+ 0.09	+ 0.34	− 0.53	+ 0.28
35	0	− 0.16	+ 0.24	+ 0.10	+ 0.30	− 0.17

Table III gives the zonal astigmatic errors, the difference in focal-length in the two planes, found by subtracting the mean zone values of Table I from the individual results. The signs of the errors are given for the position angle indicated in column 2. It is of course understood that the values for the planes at right angles have opposite signs. The errors are exceedingly small, about of the order of the error of measurement. Their reality is therefore questionable. The mean value, however, for all zones of the five tests irrespective of sign is 0.152 mm. For comparison it may be stated that the mean astigmatic error for the 40-inch of the Yerkes Observatory, derived in the same way, is 0.726 mm. Again it should be stated that the results for the five different tests are not directly comparable.

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[11] *Popular Astronomy*, **22**, 422, 1914.

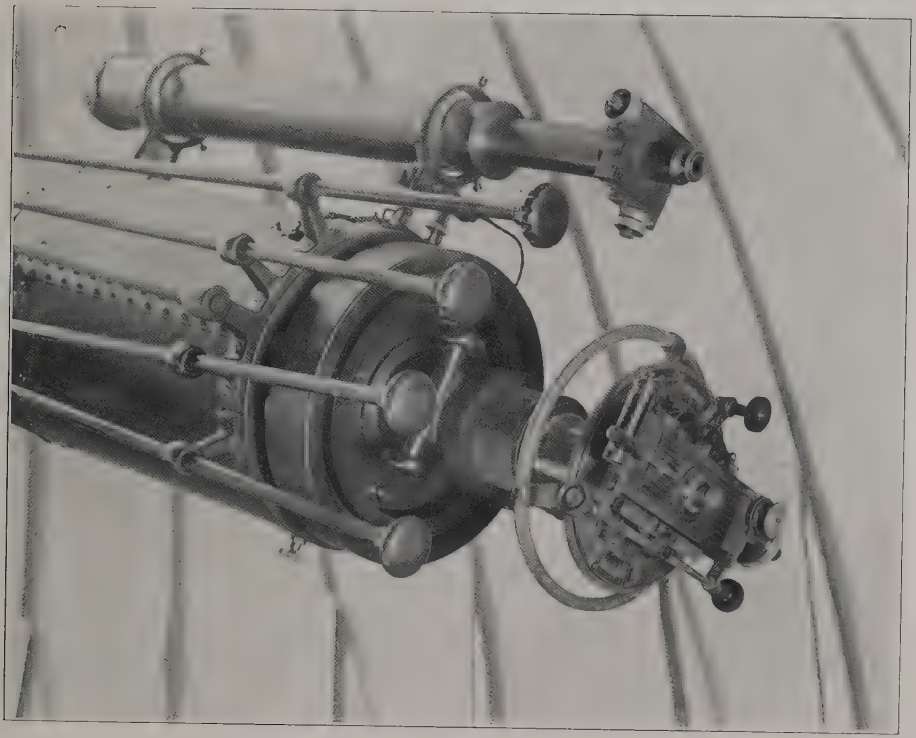
The determination of the form of the color-curve of the objective was also a part of the investigation, in fact preceded the zonal-foci tests. A knowledge of its form was one of the essential items in the preparation of the specifications for the color-filter used in later photographic observations. A make-shift spectrograph was applied by two methods, that of Hartmann, using a zone-plate and extra focal exposures; and the older method of constrictions in stellar spectra obtained at various focal settings. For the Hartmann test the diaphragm had apertures on zones of radius 110 and 200 mm. All the tests were made on Vega in April, 1912. The agreement of results from the two methods is shown in Table IV, or perhaps to better advantage in the platted curve, Fig. 4. In the Table the first column gives the wave-lengths for which succeeding columns give focal-settings. As the slit of the spectrograph was not at the same distance from the zero of the focal-setting scale as the plate in the double-slide plate holder, the reading for the yellow is not identical with that indicated by the zonal-foci tests. Column 2 gives results from the method of strictures; the remaining columns, from

TABLE IV.

COLOR-CURVE.

λ	Strictures	H_1, F= 435, 535 mm			H_2, F = 435, 470, 535 mm				
		200	110	Mean	200	110	200	110	Mean
	mm	mm	mm	mm	mm	mm	mm	mm	mm
7000	466.0								
6610	464.0								
6220	463.0								
6130	462.0								
5970	461.0								
5910	460.0								
5890	460.0								
5675		460.5	460.9	460.7					
5540					460.7	460.5	.....	.....	460.6
5525		460.6	460.9	460.8					
5300	460.0								
5290	460.0								
5130	461.0								
5090	462.0								
5000	463.0								
4980	464.0								
4900	465.0								
4830	466.0								
4680		467.0	466.8	466.9	466.5	466.7	.....	.....	466.6
4650	468.0								
4580		469.3	469.1	469.2					
4570	470.0				.....	.....	470.0	470.0	470.0
4480		471.9	471.9	471.9	471.6	471.7	.....	.....	471.7
4380	475.0								
4340		476.6	476.2	476.4	476.5	476.2	.....	.....	476.4
4240	480.0								
4200		483.2	482.6	482.9	483.2	482.3	483.7	481.8	482.8
4170	485.0								
4102	490.0	489.0	487.8	488.4	489.1	487.8	489.5	488.1	488.6
4035		493.5	492.1	492.8					
4025					494.3	492.8	494.3	493.2	493.7
4020	495.0								
3970		499.1	498.0	498.5	.....	.....	499.3	497.5	498.4
3933					.....	.....	502.5	500.7	501.6
3880	510.0								
3770	520.0								
3720	530.0								

PLATE IV.



The Micrometer on the 18½-Inch Refractor.

the two Hartmann tests. Three different plates are employed in H_2 at the focal-settings indicated. In the curve the stricture values of column 2 are represented by circles; the mean values from the Hartmann tests, by black dots.

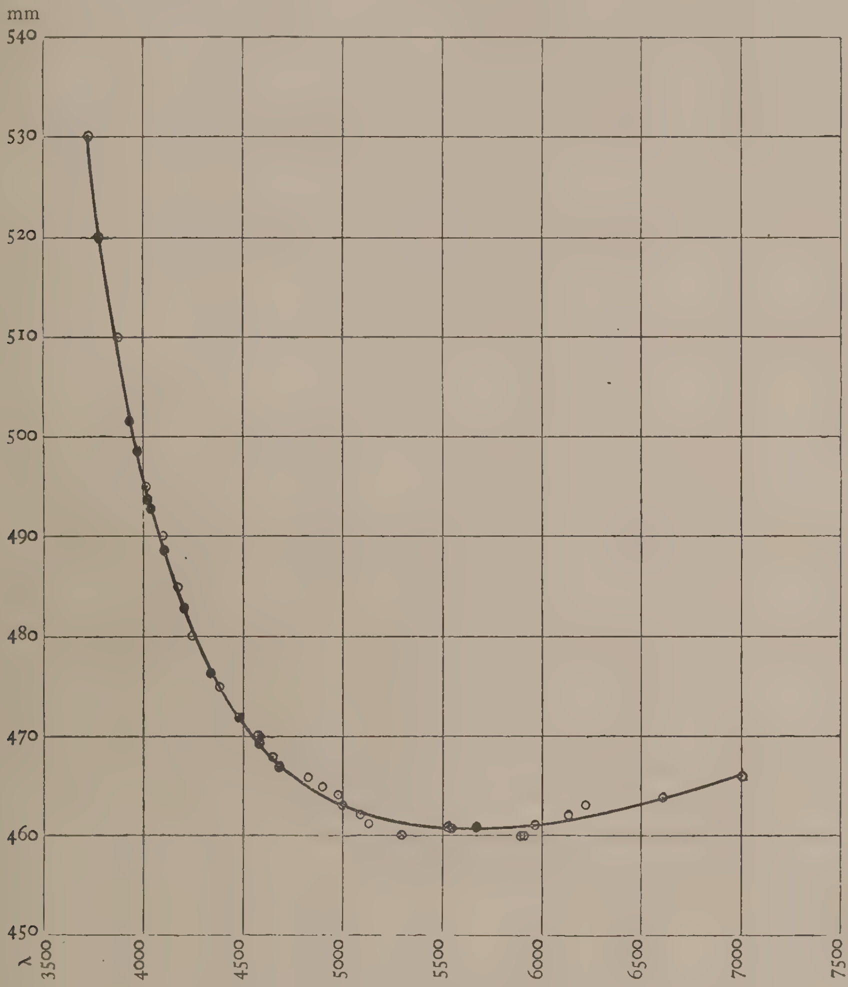


Fig. 4. Color-Curve of the 18½-Inch Objective of the Dearborn Observatory.

Observations.

It is fitting that the first volume of publications from the Dearborn Observatory should be one of measures of double stars, for its telescope had leaped to fame in this field before leaving the makers' hands, by the detection with its use of the well-known, though hitherto invisible companion of Sirius.[12] And since that time much of the observing with it has been in this field. The measure of its activity is revealed in the long series of double stars discovered and measured with it by Hough and by Burnham.

An investigation of the value of one revolution of the screw of the Saegmüller micrometer, Plate IV, confirmed the value which had been used by Hough and Burnham, and has been used throughout the present series of observations: $1^R = 14''.840$. Some slight alteration was found necessary in the electric illumination of the cross wires, but otherwise the instrument is in the form in which they used it.

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[12] For this discovery Mr. A. G. Clark was awarded the Lalande Prize of the French Academy of Sciences. *C. R.*, LV, 937, 1862.

It has been the aim to measure each star on three nights and to make on each night four settings for position angle and three or more settings of double distances. In measuring the angle the head has been held in such position that the cross wires were always either perpendicular or parallel to the pupillary line. In general the stars have been set midway between the cross wires in seeking parallelism; but in case of wide pairs they have been bisected by a single wire. The choice of eye-piece has been guided by the character of the star and the seeing, the range being between power of 275 and 1,100. For each star are given the Burnham General Catalogue number, the name of the star, and the right ascension and declination for 1880. In some cases also the magnitudes are given. The first column gives the date; the second, the position angle; the third, the distance; and the fourth, the aperture of the telescope employed. In this column '40' and '12' refer to the 40-inch and 12-inch telescopes at the Yerkes Observatory; where no designation is given, it is understood that the 18½-inch of the Dearborn Observatory was used.

The measures are grouped in four parts. First, a complete series of measures of the stars discovered by Edward S. Holden at the Washburn Observatory of the University of Wisconsin. To this list has been added a few miscellaneous stars discovered by him at other stations. I wish here to acknowledge with thanks the courtesy of Mr. R. T. A. Innes, Director of the Union Observatory at Johannesburg, Transvaal, South Africa, who very kindly measured those southern stars discovered by Holden while on an eclipse expedition to Caroline Island. These stars are too far south to be included within the limitation of Burnham's General Catalogue but all are found in Innes' Reference Catalogue of Southern Double Stars. Some of them had been previously detected by other observers, but all are given here in regular sequence to make the list complete, although proper credit to the original discoverer is noted. For the Holden stars, as well as those of Küstner which follow them, references are given to every measure of them published subsequent to the appearance of Burnham's General Catalogue and down to 1914.

The second part is a similar complete list of measures of the stars discovered by Professor F. Küstner, at Bonn. The third part is a series of observations of miscellaneous double stars, for the most part selected from Burnham's General Catalogue. In this section are reprinted two short lists of observations previously published in the *Astronomische Nachrichten*[13] and the *Astronomical Journal*.[14] For a considerable number of pairs, additional stars have been measured for the purpose of future use for the determination of proper motion, etc. In the fourth part is given a short list of new double stars which have been discovered in the course of the observations.

I wish here to express my appreciation to the Trustees of the University for appropriating funds for the publication of this volume and also to the Chicago Astronomical Society for contributing toward this purpose, and personally to Professor Elias Colbert for reading and verifying the historical notes.

Philip Fox.

Dearborn Observatory,
April 30, 1915.

[13] *A. N.* (4336)

[14] *A. J.* 611.

β G.C. **80** Hn 1

R.A. $0^h\ 8^m\ 15^s$ Decl. + 53° 10′

1908.736	8°.4	2″.56	40
08.755	8.8	2.32	40
08.793	7.6	2.44	40
1908.761	8.3	2.44	

These are the only measures since the publication of Burnham's General Catalogue (β G. C.). The motion indicated from the early measures is not substantiated.

190 Hn 2

R.A. $0^h\ 18^m\ 51^s$ Decl. + 50° 54′

1908.736	152°.6	2″.73	40
08.755	332.6	2.91	40
08.793	332.5	2.77	40
09.597	331.6	2.74	40
1908.970	332.3	2.79	

The other observations since β G. C. are:

1909.86	335°.7	2″.84	1n	Storey
1910.55	331.9	2.73	3n	Do

[Storey (*M. N.* LXX, 466) . . . Doberck (*A. N.* 4479)]

The distance is perhaps increasing.

309 Hn 61

R.A. $0^h\ 28^m\ 57^s$ Decl. + 14° 13′

1908.755	227°.5	1″.83	40
08.887	220.9	1.60	40
08.909	226.0	1.45	40
09.578	224.2	1.62	40
12.623	226.7	1.68	18½
1909.750	225.1	1.64	

1909.92	226°.8	1″.55	1n	Furner

[Furner (*Greenwich Obsns.* 1909)]

No change.

399 Hn 3

R.A. $0^h\ 38^m\ 24^s$ Decl. + 52° 54′

1908.736	50°.4	3″.23	40
08.755	50.9	2.85	40
08.793	50.9	3.00	40
1908.761	50.7	3.03	

1909.86	53°.7	2″.85	2n	Storey
1910.27	52.1	2.90	3n	Do

[Storey (*M. N.* LXX, 466) . . . Doberck (*A. N.* 4479)]

No change.

500 Hn 4

R.A. $0^h\ 50^m\ 34^s$ Decl. + 53° 45′

1908.736	122°.9	0″.99	40
08.755	127.0	1.01	40
08.793	126.4	0.97	40
08.971	124.3	0.73	12
1908.814	125.1	0.93	

1909.98	123°.4	0″.95	1n	Storey

[Storey (*M. N.* LXX, 466)]

No change.

540 Hn 62

R.A. $0^h\ 56^m\ 5^s$ Decl. − 9° 30′

1908.851	288°.2	1″.23	40
09.559	288.7	1.21	40
09.733	289.9	1.11	18½
09.758	290.7	1.26	18½
1909.475	289.4	1.20	

1903.63	289°.2	1″.21	2n	D
1905.98	292.0	1.30	2n	Ol

[Dinwiddie (*Wash. Obsns.* II, Vol. VI) . . . Olivier (*A. N.* 4166)]

No change.

552 Hn 5

R.A. $0^h\ 57^m\ 31^s$ Decl. + 27° 8′

1908.736	177°.1	3″.49	40
08.755	177.7	3.48	40
08.793	176.2	3.37	40
1908.761	177.0	3′.45	

1907.73	176°.9	3″.29	3n	Doo
1912.79	176.1	2.82	3n	Abetti

[Doolittle (*Pub. Flower Obsy.* IV) . . . Abetti (*A. N.* 4659)]

No change.

823 Hn 6

R.A. $1^h\ 29^m\ 6^s$ Decl. + 32° 26′

1908.698	285°.9	2″.21	40
08.717	289.0	2.25	40
08.736	.....	2.24	40
08.793	288.4	2.21	40
1908.736	287.8	2.23	

1906.07	105°.8	2″.33	4n	Es
1909.81	108.9	2.08	3n	Doo
1912.93	104.9	2.17	4n	Do

[Espin (*M. N.* LXVII, 190) . . . Doolittle (*Pub. Flower Obsy.* IV) . . . Doberck (*A. N.* 4715)]

1241 Hn 7

R.A. $2^h\ 16^m\ 49^s$ Decl. + 57° 39′

1908.698	182°.8	2″.09	40
08.717	184.0	2.01	40
08.736	186.6	1.96	40
1908.717	184.5	2.02	

No other measures since β G. C. Fixed.

1316 Hn 63

R.A. $2^h\ 27^m\ 53^s$ Decl. + 11° 18′

1908.717	289°.1	1″.22	40
08.736	289.0	1.04	40
08.793	286.4	0.98	40
08.851	287.7	0.96	40
1908.774	288.0	1.05	

1908.93	286°.4	1″.07	2n	Bowyer
1910.85	287.3	1.10	3n	Doo
1911.71	288.8	0.87	2n	Bowyer
1911.83	291.7	1.02	1n	Chapman
1913.00	292.1	1.00	1n	Bowyer

[Bowyer (*Greenw. Obsns.* 1908) . . . Doolittle (*Pub. Flower Obsy.* IV) . . . Bowyer, Chapman (*M. N.* LXXIII, 93) . . . Bowyer (*M. N.* LXXIV, 137)]

No change.

1417 Hn 64

R.A. $2^h\ 39^m\ 20^s$ Decl. + 1° 3′

1908.678	218°.3	5″.10	40
08.698	217.9	5.38	40
08.717	218.4	5.36	40
1908.698	218.2	5.28	

1907.36	218°.1	5″.15	3n	β
1911.39	215.3	5.39	3n	Abetti
1911.93	216.1	5.16	3n	Doo

[β (*Carnegie Inst.* 168, *A. N.* 4261) . . . Abetti (*A. N.* 4581) . . . Doolittle (*Pub. Flower Obsy.* IV)]

Probably no change.

1723 Hn 8

R.A. $3^h\ 21^m\ 57^s$ Decl. + 49° 22′

1908.678	173°.4	2″.48	40
08.698	174.5	2.41	40
08.717	174.7	2.45	40
1908.698	174.2	2.45	

1913.61	175°.9	2″.39	3n	Do

[Doberck (*A. N.* 4715)]

Probably no change. The distance is larger in recent measures.

1748 Hn 65

R.A. $3^h\ 25^m\ 24^s$ Decl. − 6° 6′

1908.736	8°.2	4″.42	40(a)
08.793	7.2	4.13	40
08.799	5.4	4.26	40
1908.776	6.9	4.27	

(a) Clouds.

1907.81	8°.1	3″.99	3n	β
1908.82	7.8	4.08	3n	Doo

[β (*Carnegie Inst.* 168, *A. N.* 4261) . . . Doolittle (*Pub. Flower Obsy.* IV)]

Probably no change though the angle is larger in recent measures.

1778 Hn 9

R.A. $3^h\ 29^m\ 11^s$ Decl. + 47° 43′

1908.678	55°.7	1″.44	40
08.698	55.7	1.54	40
08.717	55.5	1.44	40
1908.698	55.6	1.47	

1911.47	63°.0	1″.82	2n	Do

[Doberck (*A. N.* 4572)]

No change. My measures of the angle seem low

1837 Hn —

R.A. $3^h\ 37^m\ 4^s$ Decl. + 23° 39′

1912.680	307°.4	5″.91	18½
12.856	309.6	5.71	18½
12.877	308.0	5.74	18½
15.629	306.8	5.70	18½
15.637	307.6	5.86	18½
15.640	308.2	5.79	18½
1912.804	308.3	5.79	
1915.635	307.5	5.78	

1909.84	309°.9	5″.59	2n	Doo
1911.83	130.1	5.85	1n	Chapman

[Doolittle (*Pub. Flower Obsy.* IV) . . . Chapman (*M. N.* LXXIII, 93)]

1925 Hn 66

R.A. $3^h\ 46^m\ 48^s$ Decl. − 8° 51′

1908.698	28°.3	2″.23	40
08.851	30.5	....	40 (a)
09.755	29.2	2.40	18½
10.046	27.7	2.40	18½
1909.337	28.9	2.34	

(a) Clouds.

1901.99	29°.9	2″.10	3n	Com
1906.11	36.5	2.18	3n	Doo
1910.72	36.5	2.08	2n	β

β measures A and C (10.7) as follows:

1910.73	14°.0	117″.32	3n	β

[Comstock (*Pub. Washburn Obsy.* X) . . . Doolittle (*Pub. Flower Obsy.* IV) . . . β (*Carnegie Inst.* 168, *A. N.* 4464)]

Apparently fixed.

1947 Hn 67

R.A. 3^h 48^m 54^s Decl. − 13° 4′

1915.629	150°.1	2″.86	18½
15.637	150.6	2.92	18½
15.640	149.9	2.89	18½
1915.635	150.2	2.89	

1906.52	153°.0	2″.55	2n	Ol
1908.84	152.6	2.65	3n	Doo

[Olivier (*A. N.* 4227) . . . Doolittle (*Pub. Flower Obsy.* IV)]

1951 Hn 68

R.A. 3^h 49^m 50^s Decl. − 17° 19′

1909.725	176°.7	9″.02	18½
09.733	175.9	9.22	18½
09.755	176.0	8.77	18½
1909.738	176.2	9.00	

No other measures since β G. C. No rapid change would be expected in a pair of this character and none is indicated.

1957 Hn 69

R.A. 3^h 50^m 53^s Decl. + 18° 35′

1908.717	189°.2	2″.48	40
08.736	189.2	2.73	40
08.755	188.6	2.60	40
1908.736	189.0	2.60	

1910.72	188°.1	2″.01	3n	Do
1910.95	190.1	2.00	3n	Doo

[Doberck (*A. N.* 4507) . . . Doolittle (*Pub. Flower Obsy.* IV)]

No change. My measures of distance seem large.

1970 Hn 70

R.A. 3^h 52^m 11^s Decl. − 5° 15′

1908.678	271°.7	3″.73	40
08.717	271.2	3.63	40
08.736	272.3	3.71	40
1908.710	271.7	3.69	

1906.03	271°.1	3″.42	3n	Ol

[Olivier (*A. N.* 4166)]

Without change.

1972 Hn 71

R.A. 3^h 52^m 21^s Decl. − 9° 15′

1909.755	154°.3	4″.23	18½
10.022	151.1	4.01	18½
10.046	152.9	3.95	18½
10.137	156.4	3.87	18½
1909.990	153.7	4.01	

No recent measures. Fixed.

1984 Hn 10

R.A. 3^h 53^m 42^s Decl. + 48° 3′

1908.678	88°.9	4″.24	40
08.698	88.0	4.09	40
08.717	87.8	4.10	40
1908.698	88.2	4.14	

1908.94	89°.9	4″.23	3n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

No motion.

2021 Hn 72

R.A. 3^h 59^m 4^s Decl. − 9° 4′

1909.755	36°.9	2″.28	18½
09.911	33.2	2.33	18½
10.046	32.5	2.43	18½
10.181	31.1	2.21	18½
1909.973	33.4	2.31	

1908.03	35°.4	2″.05	2n	Ol
1908.03	35.0	2.06	2n	Wil

[Olivier, Wilson (*A. N.* 4360)]

There is no change.

2702 Hn 73

R.A. 5^h 17^m 20^s Decl. − 17° 23′

1908.884	52°.6	2″.66	12
08.971	54.2	2.64	12
09.102	52.2	2.56	12
1908.986	53.0	2.62	

There are no other measures since β G. C. The present measures of angle indicate increase but further measures are needed.

2708 Hn 74

R.A. 5^h 17^m 58^s Decl. − 17° 18′

1908.884	234°.8	6″.30	12
08.971	235.0	6.20	12
09.102	234.8	6.31	12
1908.986	234.9	6.27	

1911.14	234°.4	5″.65	1n	Jonck

[Jonckheere (*M. N.* LXXII, 156)]

There is no change.

2753 Hn 75

R.A. $5^h\ 21^m\ 55^s$ Decl. − 8° 49′

1908.884	87°.1	6″.47	12
08.971	86.8	6.29	12
09.102	87.6	6.11	12
09.755	87.4	6.40	18½
1909.178	87.2	6.32	

These are the only observations since the original measure of 1888. There is no motion.

2824 Hn 76

R.A. $5^h\ 28^m\ 36^s$ Decl. − 14° 27′

A and B

1909.755	233°.7	2″.12	18½
10.181	235.8	2.17	18½
10.184	232.0	2.21	18½
1910.040	233.8	2.17	

A and C

1909.755	207°.7	3″.84	18½
10.102	211.3	3.22	18½
10.137	209.0	3.66	18½
10.181	210.1	3.73	18½
1910.044	209.5	3.61	

B and C

1910.102	353°.1	1″.39	18½

B and D

1910.102	317°.3	75″.12	18½

A and D

1909.755	314°.5	75″.12	18½
10.181	314.6	74.76	18½
1909.968	314.5	74.94	

There are no other measures since the publication of β G. C. A and B show a marked decrease in angle. For A and C the angle is probably decreasing and the distance increasing. The star D has not been measured before.

2953 Hn 77

R.A. $5^h\ 39^m\ 45^s$ Decl. − 15° 13′

1909.755	291°.8	2″.27	18½
09.909	292.4	2.11	18½
09.911	291.0	2.10	18½
1909.858	291.7	2.16	

These are the only measures since 1888 and indicate no change.

2993 Hn 78. SD − 12° (1280)

R.A. $5^h\ 44^m\ 9^s$ Decl. − 12° 36′

1908.971	165°.0	1″.80	12
09.173	162.5	1.81	12
09.909	162.4	1.96	18½
10.200	162.7	1.99	18½
1909.563	163.1	1.89	

No other measures since the original observation in 1888. No significant change.

3316 Hn 79

R.A. $6^h\ 14^m\ 13^s$ Decl. − 5° 57′

1909.911	322°.6	3″.19	18½
09.975	324.6	2.98	18½
10.115	322.5	3.18	18½
1910.000	323.2	3.12	

No measures since those of Comstock in 1888. Unchanged.

3511 Hn 80

R.A. $6^h\ 31^m\ 41^s$ Decl. − 14° 9′

1908.966	311°.7	4″.17	40
08.971	310.4	4.07	12
09.173	129.9	4.09	12
09.909	128.4	4.11	18½
11.922	309.5	4.32	18½
1909.788	310.0	4.15	

The only measures since 1888. Fixed. The stars are of equal magnitude so the quadrant is uncertain.

3531 Hn 81 (8.5 ... 11.0)

R.A. $6^h\ 33^m\ 31^s$ Decl. − 13° 56′

1908.966	185°.4	4″.23	40
08.971	184.0	4.10	12
09.173	183.5	3.97	12
09.911	182.1	4.13	18½
11.922	184.6	4.39	18½
1909.789	183.9	4.16	

Since the original measures, only the following very discordant measures from the Tacubaya astrographic plates have been published:

1902.08	292°.7	9″.66	2	Gallo (A and B)
1902.08	216.0	4.88	2	Gallo (B and C)

[Gallo (*Bol. Obsy.* Tacubaya No. 4, 158)]

No motion indicated by the micrometer observations.

3661 Hn 82

R.A. $6^h\ 45^m\ 18^s$ Decl. − 11° 38′

1909.911	223°.1	2″.00	18½
09.975	220.6	1.78	18½(a)
10.151	222.8	1.91	18½
1910.012	222.2	1.90	

(a) Seeing very poor.

1909.01 219°.8 1″.76 2n Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

These are all the recent observations. Without change.

3665 Hn 83

R.A. $6^h\ 45^m\ 36^s$ Decl. − 11° 17′

1909.909	160°.2	3″.04	18½
9.911	161.0	3.09	18½
9.975	160.2	3.09	18½
1909.932	160.5	3.07	

1909.02 163°.5 3″.08 4n Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

The angle seems somewhat smaller than in the early observations, but is probably unchanged.

3805 Hn 84

R.A. $6^h\ 57^m\ 43^s$ Decl. − 8° 17′

A and B

1910.151	34°.9	4″.99	18½
10.164	34.7	5.02	18½
10.200	38.2	4.93	18½
1910.172	35.9	4.98	

A and C (10.3)

1910.164	33°.4	70″.55	18½
10.217	33.2	70.42	18½
1910.190	33.3	70.48	

No measures other than these since the first observations. No change is indicated. The additional star has not been measured heretofore.

3910 Hn 85

R.A. $7^h\ 7^m\ 39^s$ Decl. − 19° 41′

1910.200	197°.6	2″.51	18½
10.994	196.2	2.00	18½(a)
11.172	194.2	2.40	18½
11.188	197.9	2.39	18½
11.196	199.2	2.26	18½
1910.950	197.0	2.31	

(a) Very difficult.

No measures between these and the original. No motion.

3932 Hn 86

R.A. $7^h\ 9^m\ 20^s$ Decl. − 25° 46′

1910.200	282°.6	6″.41	18½
10.217	283.6	6.54	18½
10.282	282.1	6.35	18½
1910.233	282.8	6.43	

1907.55 283°.4 6″.09 3n Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

These are all the observations since 1888. No evidence of motion.

3996 Hn 87

R.A. $7^h\ 14^m\ 58^s$ Decl. − 21° 39′

A and B

1908.966	273°.9	4″.70	40
09.173	274.5	4.49	12
09.271	274.2	4.50	40
10.164	274.8	4.67	18½
1909.393	274.3	4.59	

A and C (13.8)

1908.966	39°.2	9″.49	40
12.116	36.4	9.73	18½
1910.541	37.8	9.61	

A and D

1909.173	169°.1	43″.79	12

There is also a 13.5 star in 304°: 23″.

Holden 87 was later detected by Innes and appears in *M. N.* LXIV, 132, as Innes 391. He notes the presence of C in 30°+: 5″+. There is probably no change in either pair.

4000 Hn 88

Comstock could not find this pair nor could I. As noted in Vol. II β G. C. it is probably identical with Hn 87.

4198 Hn 89

R.A. $7^h\ 33^m\ 55^s$ Decl. − 16° 25′

1910.148	213°.5	2″.97	18½
10.151	214.4	2.85	18½
10.164	215.9	2.83	18½
1910.154	214.6	2.88	

There are no other recent measures. No change is shown.

4214 Hn 90

R.A. 7h 35m 36s Decl. − 16° 12′

A and B

1910.148	276°0	2″91	18½
10.151	277.9	3.31	18½
10.164	277.8	3.25	18½
1910.154	277.2	3.16	

A and C (8.9)

1910.151	214°8	97″97	18½
10.164	215.2	97.63	18½
1910.157	215.0	97.80	

C and D (11.0)

1910.151	140°6	8″64	18½
10.164	141.8	8.49	18½
1910.157	141.2	8.56	

There is also a 12.3 star 12″ *n f.*

These are the only recent measures. No material motion. The components C and D have not been observed previously.

4217 Hn 91

R.A. 7h 36m 0s Decl. − 20° 4′

1910.200	216°0	2″29	18½
10.249	219.7	2.00	18½
11.016	216.8	1.85	18½
11.172	216.5	2.14	18½
1910.659	217.2	2.07	

Nothing but this since the first measures. Fixed.

4342 Hn 92

R.A. 7h 49m 28s Decl. − 16° 20′

1910.148	269°7	2″60	18½
10.200	269.3	2.94	18½
10.994	274.0	3.06	18½
11.016	272.6	3.06	18½
1910.589	271.4	2.92	

1888.24	271°2	2″73	3n	Com
1908.12	269.1	2.75	3n	Doo
1909.18	270.9	2.85	2n	β

[Comstock (*Pub. Washburn Obsy.* VI) . . . Doolittle (*Pub. Flower Obsy.* IV) . . . β (*A. N.* 4353, *Carnegie Inst.* 168)]

As noted by Burnham and Doolittle the measures in Vol. I of β G. C. belong to Holden 91. Comstock's original measures are cited above. No change.

4373 Hn 93

R.A. 7h 53m 40s Decl. − 10° 8′

1911.172	186°4	0″71	18½
11.196	187.5	0.70	18½
11.949	180.7	0.76	18½
1911.439	184.9	0.72	

1908.19	188°9	0″92	2n	Ol
1908.19	188.9	0.95	2n	Wil

[Olivier, Wilson (*A. N.* 4360)]

Probably no change.

4381 Hn 94

R.A. 7h 54m 14s Decl. − 13° 31′

1910.148	276°4	3″29	18½
10.151	278.8	3.13	18½
10.200	277.4	3.46	18½
1910.166	277.5	3.29	

1908.18	279°6	3″23	3n	Doo
1908.19	279.3	3.30	2n	Ol
1908.19	281.6	3.28	2n	Wil

[Doolittle (*Pub. Flower Obsy.* IV) . . . Olivier, Wilson (*A. N.* 4360)]

Fixed.

4540 Hn 95

R.A. 8h 11m 8s Decl. − 28° 25′

1908.966	168°9	3″78	40
09.173	166.7	3.59	12
10.019	165.8	....	18½
10.046	166.3	3.89	18½
1909.551	166.9	3.75	

Nothing but the above since 1888. The star is fixed.

4617 Hn 96 (9.3 ... 11.0)

R.A. 8h 20m 39s Decl. − 22° 19′

1908.966	340°4	3″32	40
10.093	337.3	3.16	18½
10.102	338.8	3.01	18½
1909.720	338.8	3.16	

There are no other recent observations. The angle is possibly decreasing.

4690 Hn 97

R.A. 8h 30m 56s Decl. + 14° 40′

1910.093	65°0	5″70	18½
10.096	65.5	5.80	18½
10.102	66.0	5.64	18½
1910.097	65.5	5.71	

There are no other measures since the original ones. There is probably no change.

5076 Hn 98

R.A. $9^h\ 18^m\ 56^s$ Decl. − 23° 17′

1910.096	167°.2	....	18½
10.102	169.0	3″.23	18½
10.170	167.2	3.03	18½
10.181	167.0	3.03	18½
10.200	167.4	3.20	18½
1910.150	167.6	3.12	

1908.15	172°.8	2″.93	2n	β
1914.82	172.6	2.92	2n	Innes

[β (*A. N.* 4353, *Carnegie Inst.* 168) . . Innes (Unpublished)]

These are all of the recent measures. The distance may possibly be increasing.

5213 Hn 99

R.A. $9^h\ 42^m\ 28^s$ Decl. − 27° 3′

1908.966	218°.1	1″.74	40
09.137	216.7	2.05	40
09.246	220.1	1.91	40
1909.116	218.3	1.90	

1910.16	219°.1	1″.77	3n	Ol

[Olivier (*Bull. L. O.* 190)]

Fixed.

5367 Hn 100

R.A. $10^h\ 9^m\ 58^s$ Decl. − 17° 50′

1909.137	202°.5	1″.61	40
09.246	201.8	1.61	40
10.181	198.4	1.83	18½
10.192	201.2	1.88	18½
1909.689	201.0	1.73	

No other measures since β G. C. Without motion.

5375 Hn 101

R.A. $10^h\ 11^m\ 5^s$ Decl. − 20° 4′

1909.137	115°.3	1″.46	40
11.172	116.2	1.38	18½
11.180	115.4	1.47	18½
1910.496	115.6	1.44	

1906.25	120°.4	1″.25	1n	Ol
1914.22	113.4	1.06	2n	Spuy

[Olivier (*A. N.* 4227) . . . Van der Spuy (*Union Obsy. Circ.* 24)]

The Aitken observation of 1898 cited in β G. C. appears again in *Pub. Lick Obsy.* XII. Fixed.

5396 Hn 102

R.A. $10^h\ 14^m\ 14^s$ Decl. − 20° 45′

1911.172	169°.5	1″.63	18½
11.180	170.6	1.54	18½
11.194	169.0	1.49	18½
1911.182	169.7	1.55	

1912.35	174°.2	1″.26	2n	Innes

[Innes (*Union Obsy. Circ.* 4)]

No observations since the first except those given above. There is no change.

5401 Hn 103

R.A. $10^h\ 14^m\ 47^s$ Decl. − 15° 45′

1909.909	334°.4	1″.68	18½
10.181	337.1	1.38	18½
10.200	333.2	1.42	18½
1910.097	334.9	1.49	

1903.35	337°.2	1″.61	2n	Sk
1908.19	337.7	1.42	2n	Ol
1908.19	338.3	1.51	2n	Wil

[Skinner (*Wash. Obsns.* II Vol. VI) . . . Olivier, Wilson (*A. N.* 4360)]

Unchanged.

5402 Hn 104

R.A. $10^h\ 14^m\ 50^s$ Decl. − 16° 7′

A and B (10.0 . . . 10.1)

1915.966	194°.6	3″.38	18½
16.004	193.9	3.28	18½
16.012	194.9	3.34	18½
16.015	194.5	3.35	18½
1915.999	194.5	3.34	

1907.31	14°.8	3″.43	1n	Rice

[Rice (Wash. Obsns. II Vol. VI)]

A and C (8.0)

1915.966	269°.5	152″.26	18½
16.004	269.5	152.53	18½
1915.985	269.5	152.39	

This star was inadvertently omitted from the observing program, prepared in 1908. The omission was detected only as the observations were being arranged for publication. The measures are therefore of more recent date than others of this series.

5417 Hn 105

R.A. 10ʰ 18ᵐ 0ˢ Decl. − 19° 19′

1911.180	118°.3	1″.10	18½
11.194	117.2	1.10	18½
11.196	117.2	1.11	18½
1911.190	117.6	1.10	

There are no other measures since Comstock. Fixed.

.... Hn 106

R.A. 10ʰ 28ᵐ 35ˢ Decl. − 54° 46′

1912.39	248°.8	1″.35	Innes
12.43	249.8	1.68	Innes
1912.41	249.3	1.52	2n

[Innes (*Union Obsy. Circ.* 4)]

Discovered by Holden at Caroline Island. Too far south to be reached from this latitude. Probably no change.

5488 Hn 107

R.A. 10ʰ 29ᵐ 40ˢ Decl. − 17° 19′

1910.200	307°.4	1″.75	18½
11.180	308.3	1.81	18½
11.194	307.8	1.78	18½
1910.858	307.8	1.78	

No other recent measures. The star is unchanged.

5513 Hn 108

R.A. 10ʰ 33ᵐ 18ˢ Decl. − 16° 57′

1911.172	....	0″.80	18½
11.180	23°.7	0.96	18½
11.194	23.5	0.92	18½
11.196	21.4	0.86	18½
1911.185	22.9	0.89	

1899.29	25°.2	0″.94	1n	A
1903.36	23.1	0.97	3n	Sk
1905.61	25.1	0.88	5n	Doo

[Aitken (*Pub. L. O.* XII) . . . Skinner (*Wash. Obsns.* II Vol. VI) . . . Doolittle (*Pub. Flower Obsy.* III)]

This star is also listed as Hough 373 but Holden has the prior claim. There is no change.

5534 Hn 11

R.A. 10ʰ. 36ᵐ 15ˢ Decl. − 2° 15′

No double star fitting Holden's description was found in this region. Comstock failed to find it in 1888 and Doolittle in 1911.

5540 Hn 109

R.A. 10ʰ 37ᵐ 21ˢ Decl. − 20° 24′

1909.044	142°.4	2″.07	40
09.159	142.0	2.02	40
09.214	320.0	1.91	40
1909.139	141.5	2.00	

Since the time of discovery no other measures have been made. The star is fixed.

5555 Hn 110

R.A. 10ʰ 40ᵐ 1ˢ Decl. − 19° 5′

1908.966	273°.7	2″.53	40
09.044	275.1	2.35	40
09.159	274.3	2.36	40
1909.056	274.4	2.41	

1906.14	275°.2	1″.96	2n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

No motion.

5606 Hn 111

R.A. 10ʰ 51ᵐ 38ˢ Decl. − 17° 40′

1908.966	65°.2	5″.16	40
09.044	67.2	5.11	40
09.159	66.8	5.19	40
1909.056	66.4	5.15	

1912.90	69°.7	5″.40	3n	Abetti

[Abetti (*A. N.* 4693)]

The star measured is SD − 17° (3265) and is therefore identical with Hu 637. Abetti notes this identity in *A. N.* 4659 and 4693. No change is indicated.

.... Hn 112

R.A. 11ʰ 31ᵐ 28ˢ Decl. − 60° 14′

This star should be removed from the Holden list. It is Gilliss 165. On this account I do not give here the measures which Mr. Innes made at my request.

[Innes (*Union Obsy. Circ.* 4 and 14) . . . Hussey (*Pub. Detroit Obsy.* I)]

5958 Hn 113

R.A. 11ʰ 47ᵐ 45ˢ Decl. − 13° 43′

1908.966	266°.9	3″.30	40
09.044	267.1	3.02	40
09.060	268.1	3.15	40
1909.023	267.4	3.16	

1909.09	266°.3	3″.02	3n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

There are no other recent measures. Apparently fixed.

.... Hn 114

R.A. $11^h\ 48^m\ 58^s$ Decl. − 55° 25′

1911.29	195°6	2″45	Cox
1911.44	194.7	2.29	Cox
1913.31	195.2	2.26	Spuy
1913.44	194.2	2.18	Spuy
1911.36	195.1	2.37	2n
1913.38	194.7	2.22	2n

1914.39	193°4	2″41	4n	Voûte

[Cox (*Transvaal Obsy. Circ.* 13) . . . Van der Spuy (*Union Obsy. Circ.* 14) . . . Voûte (*M. N.* LXXV, 432)]

Too far south to reach from the Dearborn Observatory. The recent measures comfirm the retrograde motion.

.... Hn 115

R.A. $11^h\ 57^m\ 40^s$ Decl. − 57° 5′

1912.40	244°5	1″60	Innes
12.45	242.5	1.41	Innes
1912.42	243.5	1.50	2n

1902.44	244°8	1″84	2n	Innes
1913.13	245.2	1.97	3n	Hu

[Innes (*Union Obsy. Circ.* 4 and *Annals Cape Obsy.* II Part IV) . . . Hussey (*Pub. Detroit Obsy.* I)]

Apparently fixed. One of the stars discovered at Caroline Island.

6142 Hn 12

R.A. $12^h\ 15^m\ 43^s$ Decl. − 1° 57′

A and B

1909.044	99°1	1″07	40
09.159	94.0	1.07	40
09.214	97.1	1.19	40
09.246	97.2	1.19	40
1909.166	96.9	1.13	

A and C (12.8)

1909.214	314°1	45″75	40

A and D (10.3)

1909.246	306°1	113″48	40
10.200	306.1	113.84	18½
1909.723	306.1	113.66	

1909.22	94°2	1″28	2n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

The distant stars have no earlier measures. As yet there is no motion in AB.

6168 Hn 13

R.A. $12^h\ 20^m\ 17^s$ Decl. – 1° 13′

A and B

1909.044	147°7	1″46	40
09.214	149.4	1.38	40
09.246	148.2	1.51	40
1909.168	148.4	1.45	

A and C (11.3)

1909.214	73°9	134″55	40
10.246	73.8	134.12	18½
1909.730	73.8	134.33	

C and D (13.5)

1909.214	350°5	15″12	40

There is a star of 14 magnitude in 341°3: 30″3 ± measured with 40-inch.

1903.38	149°4	1″47	4n	Sk
1905.09	150.8	1.33	3n	Doo
1907.38	148.1	1.25	2n	Lv

[Skinner (*Wash. Obsns.* II Vol. VI) . . . Doolittle (*Pub. Flower Obsy.* IV) . . . Leavenworth (*A. J.* 633)]

Perhaps slow retrograde motion. No prior measures of the distant stars.

.... Hn 116

R.A. $12^h\ 31^m\ 24^s$ Decl. − 55° 16′

1912.40	195°4	1″54	Innes
12.55	196.2	1.76	Innes
1912.48	195.8	1.65	2n

1913.12	193°3	1″95	3n	Hu

[Innes (*Union Obsy. Circ.* 4) . . . Hussey (*Pub. Detroit Obsy.* I)]

One of Holden's Caroline Island stars. Apparently fixed.

6276 Hn 117

R.A. $12^h\ 43^m\ 4^s$ Decl. + 8° 18′

1909.044	196°3	2″54	40
09.159	14.8	2.74	40
09.178	15.2	2.44	40
1909.127	15.4	2.57	

1908.36	195°0	2″39	2n	Bowyer
1909.39	196.2	2.19	2n	Bowyer
1910.18	16.2	2.36	2n	Doo
1911.38	195.9	1.78	3n	Do

[Bowyer (*Greenwich Obsns.* 1908, 1909) . . . Doolittle (*Pub. Flower Obsy.* IV) . . . Doberck (*A. N.* 4529)]

This star is also listed as Küstner 43. There is no evidence of change.

6344 Hn 14

R.A. $12^h\ 54^m\ 39^s$ Decl. $+3°\ 31'$

A and B

1909.153	258°.8	3″.33	40
09.178	260.2	3.26	40
09.214	260.6	3.29	40
1909.182	259.9	3.29	

A and C (10.5)

1909.178	101°.3	54″.20	40
09.214	101.4	54.18	40
1909.196	101.3	54.19	

1908.31	261°.3	2″.35	1n	Furner
1911.14	260.7	2.72	2n	Doo
1912.11	261.9	3.40	4n	Abetti

[Furner (*Greenwich Obsns.* 1908) . . . Doolittle (*Pub. Flower Obsy.* IV) . . . Abetti (*A. N.* 4693)]

The measures of distance are erratic but there is probably no change. There are no prior measures of the distant star.

.... Hn 118

R.A. $13^h\ 1^m\ 16^s$ Decl. $-52°\ 5'$

1912.39	209°.4	1″.51	Innes
12.55	208.3	1.41	Innes
1912.47	208.8	1.46	2n

[Innes (*Union Obsy. Circ.* 4)]

Probably without change. Discovered at Caroline Island.

.... Hn 119

R.A. $13^h\ 6^m\ 59^s$ Decl. $-62°\ 57'$

Discovered by the Melbourne observers in 1867 and properly listed as Melbourne 3. For this reason the measures by Innes are not given.

[Innes (*Union Obsy. Circ.* 4 and 14)]

6520 Hn 15

R.A. $13^h\ 26^m\ 46^s$ Decl. $-1°\ 48'$

A and B

1909.153	294°.2	16″.23	40
09.178	294.3	16.30	40
09.214	295.1	16.28	40
09.246	294.6	16.20	40
1909.198	294.5	16.25	

A and C (11.0)

1909.214	248°.9	140″.33	40
09.246	248.9	140.45	40
1909.230	248.9	140.39	

No other measures since 1888. Fixed. For the distant star there are no earlier measures.

6727 Hn 16

R.A. $14^h\ 2^m\ 9^s$ Decl. $-2°\ 58'$

1909.153	215°.9	3″.08	40
09.178	215.4	3.03	40
09.248	216.7	2.89	40
1909.193	216.0	3.00	

1903.48	217°.0	3″.20	2n	Sk
1905.29	216.3	2.68	3n	Doo
1911.15	238.8	1.59	4n	Do

[Skinner (*Wash. Obsns.* II Vol. VI) . . . Doolittle (*Pub. Flower Obsy.* IV) . . . Doberck (*A. N.* 4529)]

Aitken's observation of 1899 appears again in *Pub. L. O.* XII. Doberck's measures probably belong to another star. No motion is indicated.

6740 Hn 17

R.A. $14^h\ 4^m\ 16^s$ Decl. $-2°\ 7'$

1909.153	241°.5	4″.72	40
09.178	243.3	4.75	40
09.246	242.2	4.61	40
1909.192	242.3	4.69	

There are no other measures since β G. C. Fixed.

6808 Hn 18

R.A. $14^h\ 12^m\ 48^s$ Decl. $-17°\ 58'$

A and B

1909.246	352°.9	3″.72	40
09.252	352.1	3.86	40
09.271	352.7	3.77	40
09.312	352.5	3.73	40
1909.270	352.5	3.77	

A and C (11.8)

1909.246	335°.9	134″.56	40
09.252	335.8	134.36	40
1909.249	335.9	134.46	

1905.17	355°.4	3″.60	3n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Probably without change. For the distant star there are no prior measures. Several fainter stars nearer.

6969 Hn 19

R.A. $14^h\ 36^m\ 50^s$ Decl. $-24°\ 46'$

1909.246	194°.2	1″.95	40
09.312	194.3	1.74	40
09.425	194.0	1.83	40
1909.328	194.2	1.84	

1905.48	196°.9	1″.64	3n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Fixed.

6990 Hn 20. 5 *Librae*

R.A. $14^h\ 39^m\ 21^s$ Decl. $-14°\ 57'$

1909.153	241°.3	3″.20	40
09.214	247.5	2.97	40
09.246	244.2	3.03	40
09.252	242.1	3.17	40
1909.216	243.8	3.09	

1906.06	246°.9	2″.85	8n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Possibly slight motion but it is not yet certain.

7039 Hn 120

R.A. $14^h\ 46^m\ 46^s$ Decl. $+8°\ 16'$

A and B

1909.153	222°.7	23″.42	40
09.178	222.2	23.08	40
09.246	222.8	23.11	40
09.252	222.3	22.88	40(a)
1909.207	222.5	23.12	

A and C (12.0)

1909.178	43°.8	91″.75	40
09.252	43.5	91.58	40(a)
1909.215	43.6	91.66	

(a) Fleeting glimpses through clouds.

The distance is certainly markedly less than in the early observations. C has not been previously observed.

7053 Hn 21

R.A. $14^h\ 48^m\ 57^s$ Decl. $-14°\ 15'$

1909.153	20°.7	3″.68	40
09.178	20.4	3.73	40
09.246	19.8	3.76	40
1909.192	20.3	3.72	

These are the only measures since β G. C. No certain change.

.... Hn — (11 ... 12.7)

R.A. $14^h\ 53^m\ 20^s$ Decl. $+2°\ 42'$

1914.454	210°.2	5″.91	18½
14.460	211.4	5.58	18½
14.493	211.3	5.65	18½
1914.469	211.0	5.71	

This star is not included in β G. C. It was found in Washington in 1875. The earliest observation is

1875.48	213°.6	5″.85	1n	Hn

[Holden (*Wash. Obsns.* 1875, 365)]

No motion.

7094 Hn 22

R.A. $14^h\ 55^m\ 19^s$ Decl. $-19°\ 48'$

A and B

1909.246	359°.3	2″.08	40
09.312	357.3	2.28	40
09.331	357.2	2.28	40
1909.296	357.9	2.21	

A and C (11.6)

1909.246	312°.3	49″.03	40
09.312	312.2	49.03	40
09.331	312.4	48.92	40
1909.296	312.3	48.99	

1905.26	1°.3	1″.97	3n	Doo
1913.50	0.7	2.26	2n	Spuy

[Doolittle (*Pub. Flower Obsy.* IV) . . . Van der Spuy (*Union Obsy. Circ.* 14)]

Appears to be no motion. For C there are no earlier observations.

7135 Hn 23

R.A. $15^h\ 2^m\ 51^s$ Decl. $-7°\ 48'$

A and B

1909.153	358°.3	3″.31	40
09.246	357.9	3.21	40
09.312	358.1	3.40	40
1909.237	358.1	3.31	

A and C (10.7)

1909.246	138°.9	164″.6	40
09.312	139.0	164.9	40
1909.279	139.0	164.8	

1911.38	357°.7	3″.28	3n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Possibly small change in angle. The distant star is here measured for the first time.

.... Hn 121

R.A. $15^h\ 3^m\ 33^s$ Decl. − 51° 38′

1911.53	219°.3	2″.00	Cox
12.45	219.0	2.26	Innes
1911.99	219.1	2.13	2n

[Cox, Innes (*Union Obsy. Circ.* 4)]

This is one of the Caroline Island discoveries for which Mr. Innes supplies the measures. Apparently fixed.

7234 Hn 24

R.A. $15^h\ 16^m\ 5^s$ Decl. − 25° 30′

1909.425	276°.7	4″.27	40
09.502	274.6	4.28	40
09.540	275.1	4.09	40
10.217	274.7	4.33	18½
1909.671	275.3	4.24	

1913.55	275°.9	3″.85	2n	Innes

[Innes (*Union Obsy. Circ.* 14)]

No motion.

7312 Hn 122

R.A. $15^h\ 28^m\ 26^s$ Decl. − 10° 7′

1909.425	339°.2	2″.33	40
09.502	338.7	2.50	40
09.540	338.2	2.22	40
1909.489	338.7	2.35	

No other observations since β G. C. Fixed.

7343 Hn 25

R.A. $15^h\ 33^m\ 35^s$ Decl. − 14° 8′

1909.153	311°.1	1″.50	40
09.246	307.9	1.63	40
09.385	308.2	1.57	40
1909.261	309.1	1.57	

1908.47	310°.2	1″.69	1n	Dugan

[Dugan (*A. N.* 4744)]

No other recent measures. The angle is smaller but change is not yet certain.

7357 Hn 123

R.A. $15^h\ 35^m\ 56^s$ Decl. − 21° 32′

1909.385	121°.1	2″.40	40
09.425	121.1	2.29	40
09.540	121.3	2.44	40
1909.450	121.2	2.38	

No measures since 1889. Fixed.

.... Hn 124

R.A. $15^h\ 36^m\ 11^s$ Decl. − 50° 24′

1911.47	207°.4	1″.86	Cox
12.47	207.6	2.26	Innes
1911.97	207.5	2.06	2n

[Cox, Innes (*Union Obsy. Circ.* 4)]

One of the double stars discovered in the Caroline Island. The duplicity had been previously noted at Cordoba in 1874. Probably no motion.

7458 Hn 125

R.A. $15^h\ 53^m\ 9^s$ Decl. − 20° 4′

A and B

1909.385	290°.7	3″.04	40
09.425	291.5	3.11	40
09.520	290.1	3.14	40
09.540	290.6	3.06	40
1909.468	290.7	3.09	

A and C (11.5)

1909.385	23°.4	27″.14	40
09.425	24.9	26.94	40
09.520	24.5	27.53	40
1909.443	24.3	27.20	

1908.57	288°.9	3″.24	1n	Motherwell
1909.40	291.1	2.97	2n	Doo

[Motherwell (*Jour. R. A. S. C.* IV, 447, *Report Chief Astronomer of Canada* 1909) . . . Doolittle (*Pub. Flower Obsy.* IV)]

There is no change. The star C has not been measured previously.

7462 Hn 126

R.A. $15^h\ 53^m\ 45^s$ Decl. − 20° 6′

1909.385	34°.6	2″.22	40
09.425	33.2	2.40	40
09.520	34.9	2.30	40
09.540	34.7	2.38	40
1909.468	34.4	2.32	

1909.40	34°.9	2″.48	2n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Fixed.

7494 Hn 127

R.A. $15^h\ 58^m\ 35^s$ Decl. − 20° 10′

A and B

1909.385	123°.6	2″.16	40
09.425	125.8	2.11	40
09.540	128.0	2.02	40
1909.450	125.8	2.10	

A and C (9.2)

1909.385	303°8	64″98	40
09.425	304.2	64.95	40
09.540	304.0	65.03	40
1909.450	304.0	64.99	
1905.33	131°2	2″09	4n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

No change. The Doolittle measure is repeated from β G. C. II to cite the reference. The distant star is connected for the first time.

7577 Hn 128

R.A. 16^h 13^m 16^s Decl. − 18° 7′

A and B

1909.252	248°6	2″21	40
09.312	247.4	2.28	40
09.331	250.1	2.12	40
1909.298	248.7	2.20	

A and C (11.2)

1909.312	340°2	94″10	40
09.331	340.2	94.52	40
1909.321	340.2	94.31	

There are no other measures since 1889. Without change. No other measures of the distant star.

7607 Hn 129

R.A. 16^h 17^m 47^s Decl. − 18° 3′

1909.252	125°2	2″85	40	
09.312	125.8	2.86	40	
09.331	125.9	2.85	40	
10.236	122.5	2.60	18½	
1909.533	124.8	2.79		
1909.41	127°6	2″66	2n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Fixed.

7620 Hn 130

R.A. 16^h 19^m 31^s Decl. − 18° 13′

1911.435	175°9	1″05	18½
11.451	173.4	1.01	18½
11.459	177.9	1.05	18½
11.462	356.8	1.10	18½
1911.452	176.0	1.05	

But one prior measure. The magnitudes are equal and the quadrant is uncertain. There is no motion.

7692 Hn 26

R.A. 16^h 31^m 10^s Decl. − 5° 16′

1909.153	3°5	6″92	40
09.178	2.9	6.87	40
09.246	182.6	6.82	40
1909.192	3.0	6.87	

No other measures since β G. C. Unchanged.

.... Hn 131

R.A. 16^h 50^m 15^s Decl. − 56° 25′

1912.56	131°5	2″31	Innes	
12.59	138.1	1.95	Innes	
1912.58	134.8	2.13	2n	
1914.70	129°1	2″16	2n	Hu

[Hussey (*Pub. Detroit Obsy.* I)]

Discovered at Caroline Island. Fixed.

7813 Hn 27

R.A. 16^h 52^m 32^s Decl. − 13° 1′

1909.153	132°8	4″93	40	
09.178	133.4	4.89	40	
09.246	134.1	4.90	40	
09.312	134.2	4.89	40	
1909.222	133.6	4.90		
1911.31	134°1	4″80	2n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Fixed.

7933 Hn 132

R.A. 17^h 11^m 36^s Decl. − 23° 52′

A and B

1909.246	29°6	2″13	40
09.502	28.7	2.04	40
09.597	28.4	2.24	40
1909.448	28.9	2.14	

A and C (9.3)

1909.246	142°5	80″11	40
09.502	142.7	80.06	40
09.597	142.8	79.94	40
1909.448	142.7	80.04	

There is no evidence of change. The distant star has not been measured before.

7980 Hn 133

R.A. 17ʰ 16ᵐ 35ˢ Decl. − 21° 36′

1910.217	162°.3	1″.02	18½	
10.433	161.5	0.88	18½	
11.429	163.1	0.98	18½	
11.432	162.2	1.13	18½	
1910.878	162.3	1.00		
1890.52	161°.1	0″.82	1n	Ho
1909.42	163.9	1.13	3n	Doo
1910.54	166.0	1.38	3n	Ol
1913.58	165.0	1.28	2n	Spuy

[Hough (*A. N.* 3234) . . . Doolittle (*Pub. Flower Obsy.* IV) . . . Olivier (*Bull. L. O.* 190) . . . Van der Spuy (*Union Obsy. Circ.* 14)]

Though cited in *Transvaal Obsy. Circ.* 6 as exhibiting motion, the evidence indicates fixity. The early measure by Hough was omitted in the β G. C. references.

7981 Hn 28

R.A. 17ʰ 16ᵐ 46ˢ Decl. − 30° 25′

1909.597	233°.2	3″.64	40	
09.636	233.4	3.68	40	
10.217	232.0	3.89	18½	
1909.817	232.9	3.74		
1905.35	232°.3	3″.35	3n	Doo
1913.55	234.5	3.60	2n	Spuy

[Doolittle (*Pub. Flower Obsy.* IV) . . . Van der Spuy (*Union Obsy. Circ.* 14)]

No motion.

7989 Hn 134

R.A. 17ʰ 17ᵐ 42ˢ Decl. − 21° 20′

1909.597	148°.5	4″.01	40	
09.636	143.7	4.29	40	
10.337	142.3	4.20	18½	
11.432	141.5	4.36	18½	
11.459	142.0	4.62	18½	
1910.492	143.6	4.30		
1904.01	146°.0	3″.81	4n	Doo

[Doolittle (*Pub. Flower Obsy.* III)]

This star is also listed by Hough as Ho 266 but Holden has the prior observation. There is possibly slight retrograde motion but it is not yet certain.

7997 Hn 135 (8.6 . . . 13.0)

R.A. 17ʰ 18ᵐ 44ˢ Decl. − 19° 11′

1911.459	98°.4	2″.89	18½
11.462	96.5	2.78	18½
11.547	95.5	3.16	18½
1911.489	96.8	2.94	

This is SD − 19° (4627). These are the first measures, previously we have only the discoverer's estimates. It was not found by Comstock (*Pub. Washburn Obsy.* VI). There is probably no change.

. . . . Hn 136

R.A. 17ʰ 23ᵐ 16ˢ Decl. − 40° 57′

1912.60	110°.3	1″.13	Innes	
12.62	109.5	0.93	Innes	
1912.61	109.9	1.03	2n	
1902.46	109°.7	0″.95	1n	Innes

[Innes (*Union Obsy. Circ.* 4 and *Annals Cape Obsy.* II Part IV)]

Discovered at Caroline Island. No motion.

8043 Hn 29

R.A. 17ʰ 24ᵐ 35ˢ Decl. − 30° 22′

1910.217	231°.4	1″.83	18½	
11.429	229.1	1.63	18½	
11.432	229.0	1.78	18½	
1911.026	229.8	1.75		
1904.73	231°.9	1″.40	4n	Doo
1909.62	228.4	1.68	4n	Ol
1913.54	229.8	1.39	2n	Spuy

[Doolittle (*Pub. Flower Obsy.* IV) . . . Olivier (*Bull. L. O.* 175) . . . Van der Spuy (*Union Obsy. Circ.* 14)]

My measures of distance seem large.

8080 Hn 30

R.A. 17ʰ 30ᵐ 29ˢ Decl. − 23° 19′

A and B

1909.425	112°.0	3″.42	40	
09.502	111.4	3.30	40	
09.559	110.9	3.48	40	
1909.495	111.4	3.40		

A and C

1909.425	338°.0	68″.05	40	
09.502	338.1	68.34	40	
09.559	338.2	68.56	40	
1909.495	338.1	68.32		
1905.34	111°.7	3″.25	3n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Unchanged. No other measures of the distant star.

8084 Hn 137

R.A. 17ʰ 31ᵐ 17ˢ Decl. − 19° 1′

1911.429	251°.3	. . . .	18½
11.432	251.8	1″.30	18½
11.459	252.2	1.09	18½
11.462	254.1	1.23	18½
1911.445	252.4	1.21	

These are the first measures of this pair. There is probably no change from the original estimated position.

8085 Hn 31. SD − 14° (4708)

R.A. $17^h\ 31^m\ 44^s$ Decl. $-14°\ 46'$

1911.432	330°.2	1″.66	18½
11.448	325.5	1.47	18½
11.451	145.8	1.72	18½
11.459	328.6	1.74	18½
1911.447	327.5	1.65	
1909.57	332°.2	1″.56	3n Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Quite certainly slow retrograde motion. This star has been erroneously identified heretofore.

8103 Hn 138

R.A. $17^h\ 34^m\ 19^s$ Decl. $-17°\ 54'$

1911.432	269°.4	2″.43	18½
11.448	269.7	2.20	18½
11.451	272.3	2.24	18½
11.459	271.9	2.27	18½
1911.447	270.8	2.29	

No other observations since β G. C. Unchanged.

8227 Hn 139

R.A. $17^h\ 48^m\ 13^s$ Decl. $-11°\ 37'$

A and B

1909.331	149°.8	3″.77	40
09.385	152.0	3.80	40
09.425	151.1	3.78	40
1909.380	151.0	3.78	

A and C (12.0)

1909.331	93°.7	65″.44	40
09.385	93.7	65.70	40
1909.358	93.7	65.57	
1905.36	151°.4	3″.60	3n Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

No change. The distant star has no earlier measures.

8275 Hn 140

R.A. $17^h\ 53^m\ 56^s$ Decl. $-20°\ 47'$

1910.722	265°.1	2″.24	18½
10.739	265.4	2.24	18½
10.747	266.1	2.31	18½
1910.736	265.5	2.26	

No change. No other measures since β G. C.

8293 Hn 32

R.A. $17^h\ 55^m\ 15^s$ Decl. $-27°\ 4'$

A and B

1909.559	98°.8	5″.08	40
09.597	99.9	4.93	40
09.636	99.2	5.06	40
10.523	100.4	5.43	18½
10.529	99.8	5.08	18½
1909.969	99.6	5.12	

A and C (11.5)

1909.559	68°.0	43″.38	40
09.636	67.5	43.25	40
1909.597	67.7	43.32	
1906.51	99°.4	4″.79	3n Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Fixed. First measures of C.

8419 Hn 141

R.A. $18^h\ 7^m\ 0^s$ Decl. $-23°\ 42'$

1911.459	27°.3	1″.33	18½
11.462	26.2	1.56	18½
11.465	27.2	1.59	18½
1911.462	26.9	1.49	

As yet there is no evidence of motion.

8427 Hn 142

R.A. $18^h\ 7^m\ 58^s$ Decl. $-11°\ 15'$

1911.432	249°.4	1″.07	18½
11.459	244.1	0.98	18½
11.462	245.7	1.19	18½
1911.451	246.4	1.08	
1903.61	248°.6	0″.97	4n D

[Dinwiddie (*Wash. Obsns.* II Vol. VI)]

Probably no change.

8458 Hn 143 = β 463

R.A. $18^h\ 10^m\ 44^s$ Decl. $-16°\ 54'$

This star was discovered earlier by Burnham so is transferred from this list. Measures will be found on page 169 of this volume.

8533 Hn 144

R.A. 18^h 18^m 29^s Decl. − 21° 6′

A and B

1909.559	39°.2	3″.11	40
09.597	218.7	3.09	40
09.636	39.0	2.96	40
1909.597	39.0	3.05	

A and C (11.5)

1909.636	279°.8	67″.64	40

C and D (11.8)

1909.636	160°.4	9″.84	40

1909.45 39°.5 2″.92 2n Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Fixed. The faint distant stars have not been measured heretofore.

8730 Hn 145. SD − 15° (5069)

R.A. 18^h 35^m 53^s Decl. − 15° 30′

1911.462	59°.5	1″.37	18½
11.465	59.8	1.32	18½
11.470	58.4	1.27	18½
1911.466	59.2	1.32	

Magnitudes are 9.0 ... 9.3. No other measures since Comstock, 1888. Fixed.

8744 Hn 146. SD − 17° (5304)

R.A. 18^h 37^m 27^s Decl. − 17° 39′

1911.462	192°.7	2″.55	18½
11.465	193.3	2.46	18½
11.470	192.7	2.46	18½
1911.466	192.9	2.49	

Magnitudes are 9.9 ... 10.3. The measure by Cogshall in 1904 makes the distance too small. There is not the slightest evidence of change.

8823 Hn 147 = Howe 44

R.A. 18^h 42^m 49^s Decl. − 17° 2′

The discovery by Howe antedates that of Holden. This star has therefore been transferred from this series. Measures will be found on page 176 of this volume.

8839 Hn 148

R.A. 18^h 43^m 56^s Decl. − 16° 54′

1910.444	15°.8	3″.71	18½
11.462	18.1	3.77	18½
11.465	20.1	3.64	18½
11.489	18.6	3.72	18½
1911.215	18.2	3.71	

No measures since 1900. As yet no motion.

8960½ Hn 33

R.A. 18^h 54^m 40^s Decl. − 28° 49′

1910.433	59°.5	2″.51	18½
10.444	59.6	2.67	18½
10.717	60.5	2.79	18½
1910.531	59.9	2.66	

1913.62 60°.0 2″.58 2n Spuy

[Van der Spuy (*Union Obsy. Circ.* 14)]

Unchanged.

9150 Hn 34

R.A. 19^h 9^m 55^s Decl. + 55° 6′

1908.616	268°.8	2″.97	40
08.755	267.7	3.09	40
09.312	268.3	3.15	40
1908.894	268.3	3.07	

1910.87 270°.5 2″.72 3n Do

[Doberck (*A. N.* 4479)]

No significant change.

9226 Hn 149

R.A. 19^h 15^m 16^s Decl. − 18° 37′

1910.433	180°.1	0″.99	18½
10.444	359.4	0.95	18½
10.717	180.8	0.88	18½
1910.531	180.1	0.94	

No other measures since β G. C. No certain evidence of motion, though recent measures of angle make it smaller.

9239 Hn 150 (9.5 . . . 11.8)

R.A. 19^h 15^m 56^s Decl. − 11° 51′

A and B

1911.462	103°.9	1″.25	18½
11.465	101.9	1.37	18½
11.492	101.5	1.28	18½
1911.473	102.4	1.30	

A and C (12.0)

1911.462	144°6	7″51	18½
11.465	144.1	7.58	18½
11.492	144.1	7.39	18½
1911.473	144.3	7.49	

No other observations since β G. C. β measured the distant star in 1903. No change.

9255 Hn 35 = Hn 151

R.A. 19h 16m 52s Decl. − 18° 44′

1910.722	189°2	1″59	18½
10.742	190.5	1.63	18½
11.462	190.0	1.62	18½
1910.975	189.9	1.61	

1908.67	193°4	1″67	1n	Ol
1908.70	192.6	1.62	2n	Wil
1908.73	192.5	1.46	1n	Neff
1908.84	192.9	1.62	2n	Doo

[Olivier, Wilson, Neff (*A. N.* 4360) . . . Doolittle (*Pub. Flower Obsy.* IV)]

Fixed.

9367 Hn 152

R.A. 19h 25m 4s Decl. − 17° 4′

1911.462	187°8	....	18½
11.476	187.1	0″78	18½
11.506	186.5	0.73	18½
11.514	191.3	0.89	18½
11.547	188.7	0.86	18½
1911.501	188.3	0.82	

No recent measures whatsoever. No material change.

9708 Hn 36

R.A. 19h 48m 12s Decl. − 20° 39′

1910.742	213°3	1″02	18½
11.476	211.8	1.05	18½
11.492	211.1	1.21	18½
1911.237	212.1	1.09	

1906.53	212°3	1″17	2n	Doo
1908.68	213.8	1.23	1n	Wil
1908.70	207.4	1.07	2n	Neff
1908.73	203.9	1.04	1n	Ol
1913.62	216.8	1.18	2n	Spuy

[Doolittle (*Pub. Flower Obsy.* IV) . . . Olivier, Wilson, Neff (*A. N.* 4360) . . . Van der Spuy (*Union Obsy. Circ.* 14)]

Entirely fixed.

9720 Hn 153

R.A. 19h 48m 58s Decl. − 13° 24′

1909.753	111°5	1″87	18½
09.758	112.4	1.96	18½
09.838	113.0	....	18½
09.909	112.6	1.88	18½
1909.815	112.4	1.90	

No other measures since the original. Apparently without change.

9867 Hn 154

R.A. 19h 58m 56s Decl. − 14° 40′

1909.753	38°1	1″32	18½
09.758	218.6	1.50	18½
09.909	216.2	1.47	18½
1909.807	217.6	1.43	

1907.74	37°7	1″42	3n	Ol
1907.74	36.7	1.46	3n	Wil

[Olivier, Wilson (*A. N.* 4227)]

Probably fixed. The magnitudes are equal and the quadrant therefore uncertain.

9878 Hn 155

R.A. 19h 59m 43s Decl. − 13° 43′

A and B

1909.636	275°3	1″79	40
09.733	274.8	1.75	18½
09.736	274.9	1.84	18½
1909.702	275.0	1.79	

A and C (11.5)

1909.636	241°7	30″26	40
09.733	241.2	30.05	18½
09.736	241.2	30.07	18½
1909.702	241.4	30.13	

1907.74	278°4	1″68	3n	Ol
1907.74	278.7	1.67	3n	Wil
1908.81	278.6	1.76	3n	Doo

[Olivier, Wilson (*A. N.* 4227) . . . Doolittle (*Pub. Flower Obsy.* IV)]

Certainly without motion. No prior measures of the distant component.

9888 Hn 156

R.A. 20h 0m 3s Decl. + 1° 39′

1909.636	251°6	1″14	40
09.736	.....	1.04	18½
09.747	252.8	0.95	18½
09.753	248.2	1.11	18½
1909.718	250.9	1.06	

No recent measures. There is no change.

9928 Hn 37

R.A. $20^{h}\ 2^{m}\ 12^{s}$ Decl. − 4° 1′

1909.502	308°.7	3″.32	40
09.559	306.6	3.33	40
09.597	308.5	3.32	40
1909.553	307.9	3.32	

1911.38	306°.9	3″.19	4n	Abetti
1911.52	308.8	3.10	3n	Doo

[Abetti (*A. N.* 4581) . . . Doolittle (*M. N.* LXXV, 666)]

No other recent measures. Slow retrograde motion is indicated.

10019 Hn 157

R.A. $20^{h}\ 8^{m}\ 35^{s}$ Decl. − 24° 34′

1909.636	236°.6	2″.27	40
09.758	237.2	2.17	18½
11.492	236.2	2.30	18½
1910.295	236.7	2.25	

1906.52	236°.7	2″.27	2n	Doo

[Doolittle (*M. N.* LXXV, 666)]

These are all the observations since the original. No evidence of change.

10128 Hn 158

R.A. $20^{h}\ 15^{m}\ 14^{s}$ Decl. + 2° 28′

1908.829	10°.0	0″.70	12
08.835	8.4	0.84	40
08.851	9.9	....	40
08.873	8.6	0.89	40
1908.847	9.2	0.81	

Since the original there are no other measures. Slight retrograde motion is indicated but additional observations are needed.

10241 Hn 38

R.A. $20^{h}\ 22^{m}\ 49^{s}$ Decl. − 8° 25′

1909.502	293°.8	2″.87	40
09.559	293.1	2.81	40
09.636	295.2	2.80	40
1909.566	294.0	2.83	

1904.57	295°.0	2″.92	1n	Ol

[Olivier (*A. N.* 4227)]

Aitken's measures of 1899 cited in β G. C. appear in *Pub. L. O.* XII. Fixed.

10248 Hn 159

R.A. $20^{h}\ 23^{m}\ 7^{s}$ Decl. − 12° 41′

1909.753	280°.8	1″.34	18½
09.758	281.1	1.32	18½
09.909	279.0	1.32	18½
1909.807	280.3	1.33	

Without motion.

10295 Hn 160 = Ho 133

R.A. $20^{h}\ 26^{m}\ 10^{s}$ Decl. − 13° 57′

1909.753	176°.0	0″.93	18½
09.758	176.1	0.92	18½
09.898	176.8	0.91	18½
1909.803	176.3	0.92	

1907.75	184°.3	0″.87	1n	Furner

[Furner (*Greenwich Obsns.* 1907)]

No significant change. The priority of discovery is uncertain. The Holden discovery had prior publication. In *A. G. Wash.* 7730 the proper motion in R.A. and Decl. are given as $-0^{s}.007$ and − 0″.11.

10297 Hn 161

R.A. $20^{h}\ 26^{m}\ 17^{s}$ Decl. − 9° 18′

1909.502	53°.7	1″.86	40
09.706	....	1.96	18½
09.753	51.6	1.74	18½
09.758	50.8	1.78	18½
1909.680	52.0	1.84	

1905.81	51°.0	2″.00	2n	Doo

[Doolittle (*M. N.* LXXV, 666)]

No material change.

10383 Hn 39

R.A. $20^{h}\ 33^{m}\ 7^{s}$ Decl. + 50° 28′

1908.616	176°.1	7″.62	40
08.736	173.9	7.69	40
08.755	174.4	7.75	40
1908.702	174.8	7.69	

1907.57	176°.2	7″.76	3n	Doo
1908.54	176.2	7.72	3n	β

[Doolittle (*M. N.* LXXV, 666) . . . β (*A. N.* 4302, *Carnegie Inst.* 168)]

Motion in such a wide pair would be unexpected. None is apparent.

10443 Hn 40 (9.0 ... 9.5)

R.A. $20^h\ 36^m\ 34^s$ Decl. − 19° 55′

A and B

1909.502	353°.6	5″.55	40
09.636	353.7	5.62	40
09.706	354.4	5.19	18½
09.711	355.0	5.27	18½
1909.639	354.2	5.41	

A and C (9.4)

1909.502	257°.5	144″.08	40
09.636	257.6	144.05	40
09.706	257.7	143.25	18½
09.711	257.5	143.59	18½
1909.639	257.6	143.74	

C and D (11.2)

1909.502	185°.5	4″.75	40	
09.636	185.6	4.76	40	
09.706	185.8	4.27	18½	
09.711	185.1	4.45	18½	
1909.639	185.5	4.56		
1907.69	356°.4	5″.18	3n	β
1907.69	257.7	143.87	3n	β
1907.69	187.9	4.34	3n	β

β (*A. N.* 4261, *Carnegie Inst.* 168)]

Measures of AB are erratic. The distance A and C is less than in 1881. Possibly slight change here.

10455 Hn 162

R.A. $20^h\ 37^m\ 33^s$ Decl. − 14° 8′

1909.502	138°.0	1″.75	40	
09.597	137.4	1.81	40	
09.753	138.7	1.62	18½	
1909.617	138.0	1.73		
1905.79	143°.4	1″.83	3n	Doo
1907.74	140.7	1.78	2n	Ol
1907.74	140.7	1.50	2n	Wil
1908.70	139.6	1.68	2n	Ol
1908.70	140.4	1.62	2n	Neff

[Doolittle (*M. N.* LXXV, 666) . . . Olivier, Wilson (*A. N.* 4227) . . . Olivier, Neff (*A. N.* 4360)]

Fixed.

10472 Hn 163

R.A. $20^h\ 38^m\ 17^s$ Decl. − 9° 42′

A and B

1909.502	100°.1	2″.11	40
09.559	100.4	2.12	40
09.597	100.9	2.11	40
1909.553	100.5	2.11	

A and C (12.5)

1909.502	239°.8	17″.78	40
09.559	239.8	17.83	40
09.597	238.6	17.97	40
1909.553	239.4	17.86	

No other measures since β G. C. Possibly slight retrograde motion but it is not yet certain. A and C first measured by β in 1905. No motion here.

10496 Hn 164

R.A. $20^h\ 39^m\ 58^s$ Decl. − 12° 44′

1909.502	113°.0	2″.76	40
09.559	112.5	2.55	40
09.597	112.2	2.82	40
1909.553	112.6	2.71	

Fixed. Nothing but these observations since 1888.

10525 Hn 41

R.A. $20^h\ 42^m\ 5^s$ Decl. + 53° 35′

A and B (12.0)

1908.616	232°.5	3″.64	40
08.736	231.2	3.36	40
08.755	232.7	3.71	40
1908.702	232.1	3.57	

A and C (10.9)

1908.616	261°.2	8″.25	40	
08.736	260.8	8.15	40	
08.755	260.9	8.17	40	
1908.702	261.0	8.19		
1908.67	235°.7	3″.59	2n	β
1908.67	261.6	8.14	3n	β

[β (*A. N.* 4302, *Carnegie Inst.* 168)]

Fixed.

10578 Hn 42

R.A. $20^h\ 46^m\ 32^s$ Decl. − 17° 44′

1909.909	220°.0	1″.01	18½
10.684	227.5	0.82	12
11.467	227.7	1.09	18½
11.656	45.1	1.17	18½
1910.929	225.1	1.02	

The second measure was made with the 12-inch of the Lick Observatory. Apparently without motion.

10579 Hn 43

R.A. $20^h 46^m 48^s$ Decl. + 2° 45′

1908.616	1°.8	1″.96	40
08.644	2.6	2.07	40
08.736	2.0	2.20	40
1908.665	2.1	2.08	

Nothing since 1888. There is no change.

10651 Hn 165

R.A. $20^h 53^m 49^s$ Decl. − 18° 7′

1909.706	161°.5	3″.61	18½
09.711	161.1	4.01	18½
09.736	160.1	3.80	18½
1909.718	160.9	3.81	

The distance is increasing if strict reliance can be placed on the measures. Further observations will be needed.

10972 Hn 44

R.A. $21^h 19^m 25^s$ Decl. + 50° 1′

1908.717	266°.9	2″.66	40
08.736	266.8	2.64	40
08.755	269.7	2.74	40
1908.736	267.8	2.68	

Without motion. No recent measures other than these.

10975 Hn 166. O. Arg. S. 21378

R.A. $21^h 19^m 39^s$ Decl. − 20° 57′

A and B

1911.656	71°.9	2″.88	18½
11.670	73.3	2.76	18½
11.673	71.2	2.72	18½
1911.666	72.1	2.79	

A and C = Howe 56 = **10958**

1911.656	143°.1	7″.89	18½
11.670	143.2	7.89	18½
11.673	145.3	7.81	18½
1911.666	143.9	7.86	

Hn 166, not found by Comstock in 1888, is probably A and B of the wider pair Howe 56. The catalogue identification is then correct for Hn 166 but the identification for Howe 56 is erroneous in β G. C. The declination for O. Arg. S. 21387 = SD − 21° (6017) is 1° erroneous in the original list and in β G. C. No certain means of testing AB for motion as there exists only the original estimated position. The measures of A and C are few and erratic but there is probably no change.

11028 Hn 45

R.A. $21^h 25^m 21^s$ Decl. + 34° 32′

1908.755	198°.7	1″.41	40
08.793	196.2	1.23	40
08.799	197.4	1.28	40
1908.782	197.4	1.31	

1909.63	199°.5	1″.35	3n	Doo
1910.81	19.0	1.06	4n	Do
1910.84	18.4	1.19	2n	Bowyer
1911.86	192.8	1.22	2n	Bowyer
1912.83	191.7	1.35	1n	Bowyer

[Doolittle (*M. N.* LXXV, 666) . . . Doberck (*A. N.* 4479) . . Bowyer (*M. N.* LXXI, 728; LXXIII, 93; LXXIV, 137)]

Apparently fixed.

11102 Hn 46

R.A. $21^h 31^m 39^s$ Decl. + 35° 52′

1908.755	197°.4	1″.72	40
08.799	198.8	1.82	40
08.909	194.9	1.62	40
1908.821	197.0	1.72	

1909.63	198°.1	1″.24	3n	Doo

[Doolittle (*M. N.* LXXV, 666)]

The other measures of distance put the components much closer. Probably no change.

11138 Hn 47

R.A. $21^h 34^m 9^s$ Decl. + 49° 23′

1908.616	224°.4	6″.78	40
08.698	224.4	6.57	40
08.717	224.7	6.61	40
1908.677	224.5	6.65	

These are the only observations since 1888. Fixed.

11186 Hn 167

R.A. $21^h 36^m 53^s$ Decl. − 14° 43′

1908.755	288°.2	1″.88	40
08.835	288.4	2.00	40
08.840	288.7	1.93	40
1908.810	288.4	1.94	

1910.68	286°.9	1″.90	2n	Ol

[Olivier (*Bull. L. O.* 190)]

Without motion.

11279 Hn 48

R.A. $21^{h}\ 44^{m}\ 18^{s}$ Decl. $+ 51^{\circ}\ 3'$

1908.616	22°.2	4″.45	40
08.698	21.0	4.56	40
08.717	21.1	4.69	40
1908.677	21.4	4.57	

1909.85	21°.7	4″.62	2n	Storey

[Storey (*M. N.* LXX, 266)]

Unchanged.

11307 Hn 49

R.A. $21^{h}\ 46^{m}\ 22^{s}$ Decl. $+ 28^{\circ}\ 22'$

1908.616	338°.7	2″.25	40
08.736	338.5	2.44	40
08.755	341.2	2.33	40
1908.702	339.5	2.34	

1909.63	342°.7	2″.28	3n	Doo

[Doolittle (*M. N.* LXXV, 666)]

No other measures in recent years. Probably no change.

11318 Hn 50

R.A. $21^{h}\ 47^{m}\ 14^{s}$ Decl. $+ 53^{\circ}\ 44'$

A and B

1908.616	172°.8	1″.59	40
08.698	170.6	1.69	40
08.717	169.6	1.68	40
08.909	173.1	1.61	40
12.669	173.6	1.65	18½
1909.522	171.9	1.64	

A and C (13.5)

1908.616	338°.8	7″.85	40
08.909	337.8	7.74	40
1908.762	338.3	7.80	

No change in either AB or AC.

11413 Hn 168

R.A. $21^{h}\ 54^{m}$: Decl. $- 15^{\circ}\ 20'$

1908.935	338°.4	3″.29	40
08.840	339.0	3.24	40
08.917	341.0	3.02	40
1908.864	339.5	3.18	

Without motion. No measures since 1883.

11768 Hn 169

R.A. $22^{h}\ 24^{m}\ 20^{s}$ Decl. $- 19^{\circ}\ 48'$

1908.835	167°.1	1″.51	40
08.840	.....	1.48	40
09.559	168.2	1.44	40
09.711	166.1	1.26	18½
09.760	166.2	1.54	18½
1909.341	166.9	1.45	

No significant change.

11823 Hn 51

R.A. $22^{h}\ 29^{m}\ 23^{s}$ Decl. $+ 1^{\circ}\ 57'$

1908.644	180°.6	0″.97	40
08.755	182.0	0.88	40
08.793	.....	0.95	40
08.829	179.0	0.73	12
1908.755	180.5	0.88	

1906.78	181°.3	1″.12	3n	Doo
1910.72	182.2	0.94	2n	β
1910.70	29.3	131.65	3n	β

[Doolittle (*M. N.* LXXV, 666) . . . β (*A. N.* 4464, *Carnegie Inst.* 168)]

The second measure of β refers to a distant star of 9.5 magnitude. As yet no motion.

11856 Hn 52

R.A. $22^{h}\ 32^{m}\ 18^{s}$ Decl. $+ 50^{\circ}\ 40'$

1908.616	282°.2	5″.01	40
08.644	283.5	4.88	40
08.698	284.7	4.92	40
1908.653	283.5	4.94	

No satisfactory evidence of motion.

11981 Hn 53

R.A. $22^{h}\ 42^{m}\ 54^{s}$ Decl. $- 7^{\circ}\ 8'$

1908.755	0°.9	1″.65	40
08.793	0.8	1.52	40
08.835	358.2	1.62	40
1908.794	0.0	1.60	

No other measures in the past twenty-one years. Fixed.

12006 Hn 54

R.A. $22^{h}\ 45^{m}\ 33^{s}$ Decl. $+50°\ 29'$

1908.616	14°.5	1″.89	40
08.644	11.5	1.79	40
08.698	11.6	1.92	40
08.717	13.1	1.97	40
1908.669	12.7	1.89	

1909.72	16°.5	1″.83	4n	Do
1909.84	13.5	1.72	2n	Storey

[Doberck (*A. N.* 4394) . . . Storey (*M. N.* LXX, 266)]

Recent measures reverse the quadrant. Apparently unchanged.

12101 Hn 55

R.A. $22^{h}\ 53^{m}\ 55^{s}$ Decl. $+39°\ 38'$

1908.736	191°.2	2″.18	40
08.755	193.3	2.16	40
08.793	189.5	1.95	40
1908.761	191.3	2.10	

1907.69	191°.2	1″.75	3n	Doo

[Doolittle (*M. N.* LXXV, 666)]

These are the only measures since 1888. No change is indicated.

12104 Hn 56

R.A. $22^{h}\ 54^{m}\ 11^{s}$ Decl. $+41°\ 11'$

1908.736	113°.8	0″.97	40
08.755	292.9	0.88	40
08.793	114.2	0.88	40
1908.761	113.6	0.91	

1911.93	117°.9	1″.10	1n	Chapman
1912.56	114.1	0.86	3n	Do

[Chapman (*M. N.* LXXIII, 93) . . . Doberck (*A. N.* 4715)]

Retrograde motion is strongly indicated.

12192 Hn 57

R.A. $23^{h}\ 3^{m}\ 49^{s}$ Decl. $+50°\ 43'$

1908.616	291°.2	2″.42	40
08.698	295.0	2.22	40
08.717	291.2	2.16	40
08.793	291.8	2.37	40
08.835	291.8	2.31	40
1908.732	292.2	2.30	

1909.86	294°.4	2″.26	2n	Storey

[Storey (*M. N.* LXX, 266)]

Fixed.

12218 Hn 170

R.A. $23^{h}\ 6^{m}\ 24^{s}$ Decl. $-22°\ 35'$

1909.758	282°.9	1″.11	18½
09.909	279.2	1.16	18½
10.684	283.6	1.07	12
11.629	284.8	1.17	18½
1910.495	282.6	1.13	

The third measure was made with the 12-inch of the Lick Observatory.

1907.81	281°.8	1″.39	2n	Ol
1907.81	281.7	1.25	2n	Wil

[Olivier (*A. N.* 4360) . . . Wilson (*A. N.* 4227)]

No significant change.

12277 Hn 171

R.A. $23^{h}\ 11^{m}\ 32^{s}$ Decl. $+16°\ 12'$

A and BC

1908.736	30°.3	2″.59	40
08.755	32.0	2.40	40
08.829	29.6	2.34	12
09.753	30.3	2.34	18½
1909.018	30.6	2.42	

B and C = Hu 497

1911.629	59°.7	0″.28	18½(a)
11.725	56.8	0.25	18½
1911.677	58.2	0.26	

(a) Just resolved.

1904.75	33°.0	2″.00	1n	Lohse
1906.86	33.7	2.26	4n	Bowyer
1907.86	32.8	2.31	3n	Bowyer
1908.82	35.8	2.49	4n	Do
1908.86	33.6	2.36	1n	Lewis
1910.75	33.4	2.45	3n	Voûte

[Lohse (*Pub. Potsdam* XX) . . . Bowyer (*Greenwich Obsns.* 1906; 1907) . . . Doberck (*A. N.* 4327) . . . Lewis (*Greenwich Obsns.* 1908) . . . Voûte (*A. N.* 4486)]

This star is also listed as Hough 198 but Holden has the prior claim to it. It is without change. The duplicity of BC was noted by Hussey. It is exceedingly difficult with the 18½-inch. I reverse the angle but in certain other estimated positions the original quadrant is indicated.

12459 Hn 58

R.A. $23^{h}\ 30^{m}\ 53^{s}$ Decl. $+53°\ 17'$

1908.616	353°.5	3″.72	40
08.698	353.7	3.58	40
08.717	351.7	3.60	40
1908.677	353.0	3.63	

1910.85	0°8	3″58	3n	Espin
1911.86	354.7	3.45	4n	Abetti
1911.92	355.6	3.34	3n	Doo

[Espin (*M. N.* LXXI, 217) . . . Abetti (*A. N.* 4581) . . . Doolittle (*M. N.* LXXV, 666)]

No certain change.

12683 Hn 59

R.A. $23^h\ 53^m\ 57^s$ Decl. + 52° 35′

A and B

1908.616	10°8	1″25	40
08.698	9.0	1.37	40
08.717	11.4	1.09	40
1908.677	10.4	1.24	

AB and C (10.7)

1908.616	308°1	18″93	40
08.717	306.7	18.93	40
1908.666	307.4	18.93	

1909.98	12°7	1″15	1n	Storey
1909.98	308.4	18.55	1n	Storey

[Storey (*M. N.* LXX, 266)]

Storey's second measure refers to AB and C. The distance for AB and C has decreased about 1″ since the earliest measures. There is no motion in A and B.

12696 Hn 60

R.A. $23^h\ 55^m\ 17^s$ Decl. + 38° 58′

1908.884	307°0	0″26	40
09.559	305.6	0.26	40 (a)
11.467	295.2	0.30	18½(b)
11.473	296.1	0.30	18½(b)
11.629	297.6	0.30	18½
11.651	294.1	0.28	18½(c)
11.722	293.8	0.28	18½
12.478	290.4	0.35	18½
12.480	288.5	0.39	18½
12.801	290.0	0.40	18½
13.622	286.2	0.38	18½
13.680	293.9	0.40	18½
13.817	290.5	0.36	18½
14.638	281.7	0.39	18½
1909.221	306.3	0.26	2n
1911.588	295.4	0.29	5n
1912.586	289.6	0.38	3n
1913.706	290.2	0.38	3n
1914.638	281.7	0.39	1n

(a) Cleanly resolved. (b) Well resolved. (c) Difficult, seeing scarcely suffices.

1907.69	316°5	0″31	1n	β
1908.03	117.9	0.65	1n	Furner
1909.22	306.3	0.26	2n	Fox
1910.78	301.9	0.26	2n	Doo

[β (*A. N.* 4302, *Carnegie Inst.* 168) . . . Furner (*Greenwich Obsns.* 1908) . . . Fox (*Pop. Astronomy* 181) . . . Doolittle (*M. N.* LXXV, 666)]

This is the only star in Holden's entire series of doubles to show marked binary character. In *Popular Astronomy No.* 181 I gave the result of a computation of an orbit for it. I realized at the time that the elements were only a more or less uncertain approximation and published them primarily to urge the need of measures. It is now evident that the period will be much longer than forty years but how much longer is very uncertain though it may well be two or three times that. It is a very interesting star.

β G.C. **6** Ku 3

R.A. $0^h\ 1^m\ 19^s$ Decl. + 19° 49′

1911.834	80°.9	0″.99
11.851	77.1	0.91
12.579	76.7	0.98
12.623	77.0	0.98
1912.222	77.9	0.96

1908.02	90°.1	1″.15	1n	Bowyer
1911.90	80.8	0.96	3n	Bowyer

[Bowyer (*Greenwich Obsns.* 1908; *M. N.* LXXIII, 93)]

Apparently fixed.

109 Ku 4

R.A. $0^h\ 10^m\ 48^s$ Decl. + 21° 7′

1912.579	132°.2	2″.43
12.584	131.5	2.34
12.623	133.2	2.51
1912.595	132.3	2.43

A star of 10.3 magnitude 2′ *sp.*

1904.84	132°.2	2″.11	1n	Bowyer
1905.64	133.9	2.25	3n	Bowyer
1908.66	130.6	2.23	1n	Bowyer
1911.85	131.9	2.12	2n	Bowyer

[Bowyer (*Greenwich Obsns.* 1904; 1905; 1908; and *M. N.* LXXIII, 93)]

There is no change. The star is A. G. Berlin 56 and is referred to in the early Greenwich measures as A. G. 56. Burnham's A. G. 56 is a different star.

190 Ku 5 = Hn 2

R.A. $0^h\ 18^m\ 51^s$ Decl. + 50° 54′

Holden has prior claim to the discovery of this pair. Measures will be found on page 21. At the date of the publication of Küstner's series of stars the labor of comparison with the various lists of prior discoveries was enormous. Burnham's General Catalogue temporarily relieved this difficulty, and completely so far as discoveries up to the time of its publication are concerned.

370 Ku 6

R.A. $0^h\ 35^m\ 6^s$ Decl. + 13° 59′

1912.579	224°.9	2″.12
12.628	225.7	2.02
12.680	224.8	2.12
1912.629	225.1	2.09

No other observations since the ones of Küstner. No significant change.

470 Ku 7 = Hd 37

R.A. $0^h\ 47^m\ 17^s$ Decl. + 2° 39′

See page 61 for measures of this pair.

723 Ku 8

R.A. $1^h\ 16^m\ 11^s$ Decl. + 48° 28′

1910.810	331°.1	2″.15
11.577	330.5	2.29
11.591	331.8	2.27
1911.326	331.1	2.24

No other measures since β G. C. Certainly fixed.

1213 Ku 9

R.A. $2^h\ 13^m\ 31^s$ Decl. + 24° 24′

1912.103	43°.8	12″.55
12.108	45.2	12.23
12.116	45.7	11.95
12.177	43.5	12.14
1912.126	44.5	12.22

Since the original measures in 1901 no observations have been made of this pair. Both angle and distance are slightly less but change is doubtful.

1294 Ku 10

R.A. $2^h\ 24^m\ 14^s$ Decl. + 32° 23′

1911.758	354°.7	3″.56
11.774	355.0	3.53
11.826	355.3	3.56
1911.786	355.0	3.55

1908.01	353°.1	3″.29	2n	Bowyer
1908.65	356.5	3.37	3n	β
1908.79	356.6	3.42	2n	Doo
1911.87	356.3	3.08	1n	Bowyer

[Bowyer (*Greenwich Obsns.* 1908; *M. N.* LXXIII, 93) . . . β (*A. N.* 4301, *Carnegie Inst.* 168) . . . Doolittle (*Pub. Flower Obsy.* IV)]

No motion.

1520 Ku 11

R.A. $2^h\ 53^m\ 9^s$ Decl. + 33° 10′

1912.108	234°.3	2″.90
12.116	53.8	2.94
12.177	53.4	2.97
1912.134	53.8	2.94

1909.84	55°.1	3″.44	2n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Measures erratic but no change.

1536 Ku 12

R.A. $2^h\ 55^m\ 7^s$ Decl. + 45° 24′

1912.108	146°.6	3″.03
12.116	145.1	2.97
12.177	146.6	3.00
1912.134	146.1	3.00

No other measures since 1901. Fixed.

1615 Ku 13

R.A. $3^h\ 7^m\ 7^s$ Decl. + 44° 25′

A and B

1911.796	59°.2	....
11.823	59.2	5″.00
11.903	60.4	5.12
12.116	58.6	5.09
1911.909	59.3	5.07

A and C (9.9)

1911.823	241°.6	62″.67
11.903	241.1	62.80
1911.863	241.3	62.73

1907.69	241°.4	4″.95	3n	Doo
1911.00	59.9	4.62	2n	Do

[Doolittle (*Pub. Flower Obsy.* IV) . . . Doberck (*A. N.* 4572)]

No motion. C has not been measured previously.

1685 Ku 14

R.A. $3^h\ 16^m\ 58^s$ Decl. + 29° 51′

1910.782	161°.5	3″.78
11.059	161.9	3.74
11.673	161.8	3.75
1911.171	161.7	3.76

These are the only measures since the original. Entirely unchanged.

1861 Ku 15

R.A. $3^h\ 39^m\ 23^s$ Decl. + 30° 26′

A and B

1912.108	159°.6	2″.20
12.116	159.4	2.21
12.177	159.4	2.07
1912.134	159.5	2.16

A and C = H 665

1912.108	253°.8	15″.15
12.116	252.6	15.28
12.177	253.4	15.37
1912.134	253.3	15.27

1909.78	255°.8	15″.04	3n	β
1910.77	256.3	14.63	2n	Jonck
1910.77	155.6	1.95	2n	Jonck

[β (*A. N.* 4426 and *Carnegie Inst.* 168) . . . Jonckheere (*Jour. Astronomique* 12)]

Fixed.

1931 Ku 16

R.A. $3^h\ 47^m\ 20^s$ Decl. + 50° 47′

1912.108	264°.5	2″.32
12.116	264.8	2.45
12.187	266.3	2.39
1912.137	265.2	2.39

1910.04	266°.0	2″.85	4n	Espin
1910.04	102.4	15.96	3n	Espin

[Espin (*M. N.* LXXI, 217)]

Espin adds a second star as cited. The angle may be decreasing slowly.

2164 Ku 17 = Ho 15

R.A. $4^h\ 16^m\ 55^s$ Decl. + 29° 51′

See page 85 for measures.

2228 Ku 18

R.A. $4^h\ 23^m\ 8^s$ Decl. + 30° 25′

1912.064	62°.9	1″.50
12.089	59.9	1.53
12.103	62.1	1.46
1912.085	61.6	1.50

1905.83	61°.4	1″.37	2n	A
1912.45	61.4	1.87	3n	Do

[Aitken (*Pub. L. O.* XII) . . . Doberck (*A. N.* 4745)]

There is no change.

2349 Ku 19 = H 349

R.A. $4^h\ 40^m\ 7^s$ Decl. + 34° 34′

Measures of this pair will be found on page 87.

2466 Ku 20 = Δ6 = β 187 *rej.*

R.A. $4^h\ 54^m\ 9^s$ Decl. + 14° 20′

Transferred from the Küstner list to page 87.

2525 Ku 21

R.A. $5^h\ 0^m\ 17^s$ Decl. + 10° 50′

1912.064	210°.2	5″.16
12.103	210.4	5.33
12.108	209.8	5.16(a)
1912.092	210.1	5.22

(a) Temperature − 7° F.

1909.94	213°.8	5″.43	2n	Doo
1911.09	209.2	4.25	1n	Jonck
1911.09	209.5	4.38	1n	Voûte
1913.04	212.6	5.26	4n	Do

[Doolittle (*Pub. Flower Obsy.* IV) . . . Jonckheere, Voûte (*M. N.* LXXII, 156) . . . Doberck (*A. N.* 4745)]

Distance possibly decreasing but further measures will be needed to demonstrate it.

2697 Ku 22 = H 364

R.A. $5^h\ 17^m\ 1^s$ Decl. + 22° 2′

See measures on page 90.

3004 Ku 23

R.A. $5^h\ 43^m\ 59^s$ Decl. + 14° 24′

1912.064	104°.3	1″.02
12.116	103.6	1.03
12.187	103.5	1.02
1912.122	103.8	1.02

1910.85	100°.7	0″.91	3n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Interval too short to show motion.

3013 Ku 24

R.A. $5^h\ 44^m\ 17^s$ Decl. + 50° 9′

1912.064	259°.7	1″.34
12.089	256.6	1.45
12.108	254.4	1.40
1912.087	256.9	1.40

There is a 13.5 magnitude star 18″ *nf.* No motion.

3364 Ku 25

R.A. $6^h\ 19^m\ 19^s$ Decl. + 9° 48′

1912.064	125°.9	3″.65
12.089	125.5	3.47
12.103	127.4	3.49
1912.085	126.3	3.54

1910.73	123°.4	3″.68	3n	Doo
1910.83	121.2	2.72	1n	Jonck
1910.83	122.3	2.70	1n	Voûte
1913.16	124.7	3.68	1n	Anderson

[Doolittle (*Pub. Flower Obsy.* IV) . . . Jonckheere, Voûte (*M. N.* LXXII, 156) . . . Anderson (*A. N.* 4678)]

Probably no motion.

3413 Ku 26

R.A. $6^h\ 23^m\ 41^s$ Decl. + 3° 26′

1912.064	150°.6	2″.14
12.089	157.2	2.23
12.103	150.4	2.15
12.108	156.6	2.26
1912.091	153.7	2.19

No other measures since Küstner. Fixed.

3556 Ku 27

R.A. $6^h\ 35^m\ 21^s$ Decl. + 14° 58′

1912.064	184°.8	7″.00
12.089	185.1	6.86
12.103	184.9	7.08
1912.085	184.9	6.98

1911.04	185°.3	6″.77	3n	Lau
1911.19	186.1	6.35	3n	Do

[Lau (*A. N.* 4541) . . . Doberck (*A. N.* 4664)]

Rapid change in such a pair would be unusual. None is found.

3939 Ku 28

R.A. $7^h\ 9^m\ 47^s$ Decl. + 5° 48′

1911.922	321°.0	1″.29
11.941	322.5	1.25
11.947	321.6	1.21
1911.937	321.7	1.25

1908.14	321°.1	1″.27	3n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

There is no change.

4015 Ku 29

R.A. $7^h\ 16^m\ 59^s$ Decl. + 40° 2′

1911.851	144°.1	3″.50
11.925	142.8	3.61
11.927	143.2	3.75
1911.901	143.4	3.62

1910.28	143°.0	3″.26	1n	Bowyer

[Bowyer (*M. N.* LXXI, 728)]

Fixed.

4137 Ku 30

R.A. 7^{h} 28^{m} 10^{s} Decl. + 34° 35′

1912.064	110°8	3″28
12.089	111.7	3.24
12.103	109.4	3.25
1912.085	110.6	3.26

13.0 magnitude stars equidistant 30″ *p* and *f*.

1912.25	112°1	3″29	1n	Chapman
1913.18	110.7	3.13	3n	Anderson
1913.28	110.0	3.26	3n	Do

[Chapman (*M. N.* LXXIV, 137) . . . Anderson (*A. N.* 4678) . . . Doberck (*A. N.* 4695)]

Without motion.

4671 Ku 31

R.A. 8^{h} 28^{m} 1^{s} Decl. + 7° 36′

1912.064	13°2	5″70
12.081	13.1	5.64
12.089	13.1	5.61(a)
1912.078	13.1	5.65

(a) Temperature − 6° F.

No other measures since the original. No significant change.

4717 Ku 32

R.A. 8^{h} 34^{m} 26^{s} Decl. + 19° 42′

1911.851	167°9	2″36
11.922	165.2	2.30
11.941	166.1	2.31
1911.905	166.4	2.32

1908.21	168°5	2″00	2n	Bowyer
1909.26	168.4	2.08	2n	Bowyer
1910.12	170.1	2.01	2n	Bowyer
1910.17	172.2	2.18	2n	Doo
1911.17	164.2	1.89	2n	Bowyer
1912.24	167.0	1.77	2n	Bowyer
1912.24	174.8	2.23	1n	Furner
1913.23	172.4	2.28	1n	Anderson

[Bowyer (*Greenwich Obsns.* 1908; 1909; *M. N.* LXXIII, 93; LXXI, 728; LXXIV, 137) . . . Doolittle (*Pub. Flower Obsy.* IV) . . . Furner (*M. N.* LXXIV, 137) . . . Anderson (*A. N.* 4678)]

Apparently fixed.

4799 Ku 33

R.A. 8^{h} 43^{m} 14^{s} Decl. + 18° 19′

1911.057	98°1	8″68
11.095	97.9	8.62
11.922	98.6	8.68
1911.358	98.2	8.66

No recent measures. Certainly unchanged.

4843 Ku 34 = H 109

R.A. 8^{h} 47^{m} 43^{s} Decl. + 13° 6′

See page 109.

5457 Ku 35

R.A. 10^{h} 24^{m} 52^{s} Decl. + 48° 0′

1912.064	18°5	1″18
12.081	17.3	1.17
12.089	13.2	1.11
1912.078	16.3	1.15

1909.23	16°0	1″20	2n	Espin

[Espin (*M. N.* LXX, 237)]

As yet no motion.

5703 Ku 36

R.A. 11^{h} 6^{m} 40^{s} Decl. + 38° 50′

1912.064	135°7	8″89
12.081	135.4	8.90
12.089	135.6	8.81
1912.078	135.6	8.87

No other measures since Küstner. Entirely unchanged.

5774 Ku 37

R.A. 11^{h} 19^{m} 15^{s} Decl. + 49° 48′

1912.064	323°5	1″85
12.081	327.1	1.85
12.089	322.9	1.80
1912.078	324.5	1.83

There are no other measures since the original. Fixed.

5780 Ku 38

R.A. 11^{h} 20^{m} 57^{s} Decl. + 19° 47′

1912.062	54°3	6″16
12.064	233.1	6.10
12.081	53.7	6.16
1912.069	53.7	6.14

1908.08	232°4	6″42	3n	Doo
1909.35	232.5	6.10	2n	Bowyer
1911.36	232.1	6.23	2n	Do

[Doolittle (*Pub. Flower Obsy.* IV) . . . Bowyer (*Greenwich Obsns.* 1909) . . . Doberck (*A. N.* 4529)]

Magnitudes equal, quadrant uncertain. No change.

5850 Ku 39

R.A. $11^h\ 30^m\ 48^s$ Decl. + 48° 8′

1912.064	28°.3	2″.45
12.081	29.0	2.37
12.089	24.6	2.40(a)
1912.078	27.3	2.41

(a) Temperature = − 8° F.

1908.27	24°.6	2″.54	1n	Espin
1908.45	202.4	2.04	1n	Furner
1911.37	26.3	2.33	3n	Doo

[Espin (*M. N.* LXIX, 218) . . . Furner (*Greenwich Obsns.* 1908) . . . Doolittle (*Pub. Flower Obsy.* IV)]

Possibly slow change in angle.

5928 Ku 40

R.A. $11^h\ 42^m\ 39^s$ Decl. + 34° 22′

1911.911	183°.4	3″.15
11.927	183.9	3.01
11.988	182.2	3.09
1911.942	183.2	3.08

1907.22	182°.6	3″.12	2n	Espin
1908.41	182.3	2.77	2n	Bowyer
1910.21	184.0	2.85	3n	Doo

[Espin (*M. N.* LXVIII, 202) . . . Bowyer (*Greenwich Obsns.* 1908) . . . Doolittle (*Pub. Flower Obsy.* IV)]

Fixed.

5966 Ku 41

R.A. $11^h\ 49^m\ 23^s$ Decl. + 17° 34′

1912.062	248°.0	5″.10
12.064	69.0	4.96
12.081	67.4	4.94
1912.069	68.1	5.00

1909.12	66°.7	4″.99	3n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Magnitudes about equal. Without motion.

6043 Ku 42

R.A. $12^h\ 2^m\ 18^s$ Decl. + 14° 44′

1912.062	256°.2	9″.22
12.064	256.5	9.13
12.081	256.2	9.13
1912.069	256.3	9.16

1911.62	257°.1	9″.85	4n	Do

[Doberck (*A. N.* 4601)]

Change in distance is indicated but it is not yet certain.

6276 Ku 43 = Hn 117

R.A. $12^h\ 43^m\ 4^s$ Decl. + 8° 18′

Listed among the Holden stars. See page 29 for measures.

6381 Ku 44 = Ho 257

R.A. $13^h\ 0^m\ 4^s$ Decl. + 26° 52′

Measures of this star are given on page 129.

6535 Ku 45

R.A. $13^h\ 28^m\ 18^s$ Decl. + 15° 53′

1912.064	297°.4	0″.93
12.092	296.8	0.94(a)
12.103	299.6	1.02
1912.086	297.9	0.96

(a) Temperature = − 12° F.

1909.40	294°.5	0″.99	1n	Furner
1912.43	297.1	0.88	1n	Furner

[Furner (*Greenwich Obsns.* 1909; *M. N.* LXXIV, 137)]

The measures indicate slow direct motion. Additional observations are needed.

6661 Ku 46 = Skinner 7

R.A. $13^h\ 47^m\ 41^s$ Decl. − 14° 32′

Measures are given on page 132.

6667 Ku 47

R.A. $13^h\ 48^m\ 40^s$ Decl. + 32° 44′

1911.109	123°.6	3″.46
11.517	128.4	3.32
11.533	128.7	3.37
14.085	129.3	3.75
14.090	128.7	3.84
14.104	128.0	3.81
1911.386	126.9	3.38
1914.093	128.7	3.80

1901.37	100°.2	1″.90	2n	Küstner
1909.38	119.2	2.01	1n	Bowyer

[Küstner (*A. N.* 3821 also β G. C.) . . . Bowyer (*Greenwich Obsns.* 1909)]

For this pair I have given Küstner's original measures to show the very decided motion. The change is probably due to proper motion of one or both stars. On the supposition that B is fixed the observations give for the motion of A:

0″.18 in 332°.7

6974 Ku 48

R.A. $14^h\ 37^m\ 18^s$ Decl. + 13° 40′

A and B

1910.337	135°6	6″83
10.340	135.1	6.71
10.408	315.2	6.75
1910.362	135.3	6.76

A and C (10.0 . . . 11.2)

1910.337	92°5	37″43
10.340	92.3	37.25
1910.338	92.4	37.34

B and C (10.1 . . . 11.2)

1910.408	83°5	32″65

1909.34	136°6	6″60	2n	Doo
1909.36	134.1	6.73	1n	Bowyer
1910.38	133.9	6.68	2n	Bowyer

[Doolittle (*Pub. Flower Obsy.* IV) . . . Bowyer (*Greenwich Obsns.* 1909; *M. N.* LXXI, 728)]

Certainly unchanged.

6994 Ku 49

R.A. $14^h\ 39^m\ 48^s$ Decl. + 41° 55′

1912.062	199°7	1″54
12.064	203.3	1.75
12.081	201.5	1.50
1912.069	201.5	1.60

1913.44	199°8	1″55	1n	Espin

[Espin (*M. N.* LXXIV, 244)]

Without motion.

7281 Ku 50

R.A. $15^h\ 22^m\ 55^s$ Decl. + 46° 35′

1914.085	333°4	3″01
14.090	333.4	3.07
14.104	333.1	3.16
1914.093	333.3	3.08

1906.70	334°9	3″06	2n	Lewis
1908.61	335.4	3.30	1n	Lewis
1910.68	333.2	6.13	2n	Furner
1911.41	334.5	2.95	3n	Doo
1911.45	333.8	3.24	3n	Espin

[Lewis (*Greenwich Obsns.* 1906; 1908) . . . Furner (*M. N.* LXXI, 728) . . . Doolittle (*Pub. Flower Obsy.* IV) . . . Espin (*M. N.* LXXII, 191)]

As noted in β G. C. this is probably identical with Lewis 13. Küstner's discoveries were made between 1894 and 1899 so he probably has priority. In publication Lewis has precedence. The 1908 measure by Lewis is *assigned* to Küstner 50. Furner's measure of distance should be halved. There is no motion.

7381 Ku 51 = Pritchett –

R.A. $15^h\ 40^m\ 12^s$ Decl. + 35° 59′

Measures of this pair are given on page 146.

7582 Ku 52

R.A. $16^h\ 14^m\ 4^s$ Decl. + 11° 11′

A and B

1910.236	46°9	9″60
10.246	47.1	9.36
10.263	47.0	9.51
1910.248	47.0	9.49

A and C (9.9)

1910.236	277°1	84″25
10.246	277.0	83.95
10.263	277.1	84.08
1910.248	277.1	84.09

No measures of AB since β G. C. and no previous measures whatsoever of A and C. AB without motion.

7616 Ku 53

R.A. $16^h\ 18^m\ 39^s$ Decl. + 38° 33′

1910.236	48°6	5″25
10.269	49.2	5.43
10.274	48.5	5.27
1910.260	48.8	5.32

1909.56	48°7	5″36	2n	Doo
1910.73	230.5	5.52	3–1	Furner

There is also an observation by Lewis assigned to Ku 43, the position however corresponding to that of Ku 53. Position angle and distance fit neither star.

1908.61	37°2	2″83	1n	Lewis

[Doolittle (*Pub. Flower Obsy.* IV) . . . Furner (*M. N.* LXXI, 728) . . . Lewis (*M. N.* LXIX, 588)]

Without motion.

7743 Ku 54

R.A. $16^h\ 39^m\ 16^s$ Decl. + 44° 8′

1911.528	97°5	9″51
11.533	97.6	9.42
11.541	97.7	9.59
1911.534	97.6	9.51

1908.39	96°9	9″07	3n	Espin
1909.56	99.5	9.50	2n	Doo
1912.52	99.5	9.90	3n	Abetti

[Espin (*M. N.* LXIX, 218) . . . Doolittle (*Pub. Flower Obsy.* IV) . . . Abetti (*A. N.* 4659)]

Measures erratic but it is probably without motion.

7765 Ku 55

R.A. $16^h\ 43^m\ 1^s$ Decl. + 15° 2′

1910.509	46°0	2″48
10.515	43.0	2.52
10.523	43.5	2.43
1910.516	44.2	2.48

1908.56	45°8	2″60	1n	Furner
1909.37	45.1	2.39	3n	Doo
1909.47	48.2	2.17	1n	Furner
1911.68	45.8	2.57	1n	Furner

[Furner (*Greenwich Obsns.* 1908; 1909; *M. N.* LXXIII, 93) . . . Doolittle (*Pub. Flower Obsy.* IV)]

Fixed.

7792 Ku 1

R.A. $16^h\ 48^m\ 27^s$ Decl. + 77° 43′

1912.064	187°7	2″92
12.415	185.5	3.04
12.420	187.8	2.98
1912.300	187.0	2.98

No other observations since β G. C. Without motion as yet.

8225 Ku 56

R.A. $17^h\ 48^m\ 4^s$ Decl. + 19° 5′

A and B

1910.458	125°5	2″60
10.460	123.4	2.83
10.465	121.9	2.85
10.479	129.0	2.78
10.482	127.1	....
1910.469	125.4	2.76

A and C

1910.458	359°2	25″01
10.460	358.9	25.52
10.465	358.8	25.66
10.479	358.6	25.44
1910.465	358.9	25.41

1910.46	129°0	2″80	3n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

No change in either pair.

9160 Ku 57

R.A. $19^h\ 10^m\ 47^s$ Decl. + 15° 21′

A and B

1912.472	229°6	9″85
12.483	229.0	9.91
12.489	230.1	9.94
1912.481	229.6	9.90

A and C (11.1)

1912.472	135°4	39″31
12.483	135.4	39.37
12.489	135.5	39.25
1912.481	135.4	39.31

1910.68	232°4	9″68	3n	Do

[Doberck (*A. N.* 4479)]

There is no change. C has not been measured before.

9518 Ku 2

R.A. $19^h\ 35^m\ 38^s$ Decl. + 71° 20′

1911.577	272°2	1″10
12.472	265.5	1.04
12.478	267.9	1.17
12.489	267.8	1.08
1912.254	268.3	1.10

1908.73	265°6	1″22	4n	Do
1908.73	267.7	0.98	3n	Bies
1909.70	269.2	1.03	2n	Storey
1910.78	267.4	1.38	1n	Storey
1911.31	267.5	1.32	3n	Doo

[Doberck (*A. N.* 4327) . . . Van Biesbroeck (*Ann. Observ. Belgique*, N. S. XIII) . . . Storey (*M. N.* LXX, 466; LXXI, 479) . . . Doolittle (*Pub. Flower Obsy.* IV)]

Aitken's 1897 measures quoted in β G. C. appear also in *Pub. L. O.* XII. Apparently without motion as yet.

9910 Ku 58

R.A. $20^h\ 1^m\ 12^s$ Decl. + 49° 18′

1910.449	186°9	2″91
10.458	188.7	2.79
10.493	185.4	2.82
1910.467	187.0	2.84

1909.79	367°3	2″67	2n	Espin
1909.79	159.2	13.88	3n	Espin

[Espin (*M. N.* LXX, 237)]

The second reference to Espin is for A and C. There is no indication of motion.

10255 Ku 59

R.A. $20^h\ 23^m\ 27^s$ Decl. + 23° 41′

A and B

1912.472	140°3	33″18
12.483	139.6	33.08
12.489	139.7	33.27
1912.481	139.9	33.18

B and C

1912.467	317°.4	4″.20
12.472	318.6	4.30
12.483	316.4	4.26
1912.474	317.5	4.25

1910.52	313°.6	3″.86	1n	Jonck

[Jonckheere (*Jour. Astronomique* 10)]

No change.

10957 Ku 60

R.A. $21^h\ 18^m\ 31^s$ Decl. $+22°\ 5'$

1912.483	47°.4	7″.23
12.489	48.3	7.23
12.500	227.9	7.20
1912.491	47.9	7.22

Magnitudes nearly equal, the quadrant is uncertain. No other measures since Küstner. Without motion.

11000 Ku 61

R.A. $21^h\ 22^m\ 56^s$ Decl. $+38°\ 4'$

A and B

1912.467	273°.2	3″.70
12.483	272.6	3.74
12.489	271.5	3.80
1912.480	272.4	3.75

A and C (12.5)

1912.623	190°.1	11″.99
12.691	193.5	11.80
1912.657	191.8	11.89

A and D 230°: 21″ (13.0)

1909.86	271°.9	3″.96	3n	Doo

[Doolittle (*M. N.* LXXV, 666)]

No measures other than these since 1901, the original set. No change in AB. C has no prior measures.

11351 Ku 62

R.A. $21^h\ 49^m\ 58^s$ Decl. $+38°\ 9'$

1912.467	50°.6	1″.60
12.483	51.2	1.66
12.489	52.4	1.66
1912.480	51.4	1.64

1906.55	50°.5	1″.52	3n	Aitken

[Aitken (*Pub. L. O.* XII)]

Probably without change.

11567 Ku 63

R.A. $22^h\ 7^m\ 15^s$ Decl. $+33°\ 23'$

1911.561	241°.5	4″.21
11.563	241.8	4.24
11.566	241.8	4.23
1911.563	241.7	4.23

1907.55	241°.2	4″.07	3n	Doo
1910.77	238.9	4.35	3n	Abetti

[Doolittle (*M. N.* LXXV, 666) . . . Abetti (*A. N.* 4490)]

Fixed.

11681 Ku 64

R.A. $22^h\ 17^m\ 8^s$ Decl. $+28°\ 13'$

A and B

1912.584	159°.8	33″.66
12.623	160.1	33.72
12.697	159.5	33.70
1912.635	159.8	33.69

A and C

1912.584	281°.8	32″.72
12.623	282.1	32.87
12.697	281.9	32.95
1912.635	281.9	32.85

C and D (12.3)

1912.623	116°.5	6″.07
12.697	113.0	6.13
1912.660	114.7	6.10

1909.69	114°.4	6″.15	2n	Doo
1910.64	160.5	34.10	3n	Phillips
1910.64	282.5	33.03	3n	Phillips
1910.64	114.6	6.26	3n	Phillips

[Doolittle (*M. N.* LXXV, 666) . . . Phillips (*M. N.* LXXI, 216)]

The distance of A and C may have increased slightly.

11747 Ku 65 = Hd Zones

R.A. $22^h\ 22^m\ 53^s$ Decl. $+0°\ 40'$

See page 209.

12054 Ku 66

R.A. $22^h\ 49^m\ 21^s$ Decl. $+32°\ 27'$

1912.500	361°.6	3″.77
12.579	359.9	3.72
12.584	360.4	3.67
1912.554	360.6	3.72

1906.88	1°.3	3″.52	3n	Espin
1909.69	3.1	3.64	2n	Doo

[Espin (*M. N.* LXVII, 190) . . . Doolittle (*M. N.* LXXV, 666)]

Probably fixed.

β G.C. **10** Σ 3063

R.A. $0^h\ 1^m\ 28^s$ Decl. − 5° 13′

1911.656	215°.4	1″.97
11.659	215.7	1.91
11.665	215.5	1.99
1911.660	215.5	1.96

The measures conform well with the slow retrograde motion.

14 Σ 3065 *rej.* = O. Stone 1.

R.A. $0^h\ 1^m\ 51^s$ Decl. − 14° 54′

1909.763	288°.1	9″.94
09.818	287.9	9.57
09.835	288.0	9.87
11.656	288.1	9.76
11.659	288.7	9.72
11.665	288.5	9.81
1910.733	288.2	9.78

The 1909 measures were published in *A. J.* 611 under β G. C. **32** = O. Stone 1. These and all previous measures belong to β G. C. **14** = Σ 3065 *rej.* See β (*Carnegie Inst.* 168). Fixed.

17 H 5533

R.A. $0^h\ 2^m\ 4^s$ Decl. + 0° 0′

1911.665	73°.5	27″.29
11.670	73.3	27.28
11.708	73.6	27.39
11.714	73.1	27.28
1911.689	73.4	27.31

No early measures for comparison. Herschel's description is:

1823 + 78° ± 25″ ±

18 Hu 2

R.A. $0^h\ 2^m\ 11^s$ Decl. − 12° 4′

1909.835	69°.5	3″.47
10.722	68.2	3.50
10.747	70.4	3.59
1910.435	69.4	3.52

The interval since discovery is too short to show motion.

.... Es 151. BD 39° (12)

R.A. $0^h\ 2^m\ 41^s$ Decl. + 39° 58′

1913.658	198°.8	6″.47
14.575	200.2	6.56
1914.116	199.5	6.51

1904.85 196°.0 6″.4 2n Es

[Espin (*M. N.* LXV, 711)]

22 Es 113

R.A. $0^h\ 4^m\ 33^s$ Decl. + 66° 35′

1909.747	122°.8	6″.94
09.758	124.4	6.93
09.763	123.4	7.17
1909.756	123.5	7.01

No motion. As pointed out by Innes and by Schroeter, this star is BD 66° (8). See also *A. J.* 611. BD 66° (6) is, however, double. See **12758**.

27 Arg. 1

R.A. $0^h\ 2^m\ 51^s$ Decl. + 58° 58′

1908.799	324°.6	23″.73	40
8.843	324.8	23.90	12
8.879	324.1	23.85	12
1908.840	324.5	23.83	

The magnitudes are equal and the quadrant uncertain. Probably fixed.

28 H 1001

R.A. $0^h\ 2^m\ 57^s$ Decl. + 44° 4′

1909.744	77°.0	15″.72
9.747	75.8	15.58
9.758	76.1	15.48
1909.750	76.3	15.59

Without motion.

29 Es 114

R.A. $0^h\ 4^m\ 20^s$ Decl. + 66° 29′

A and B

1909.747	161°.7	4″.24
9.758	163.1	4.51
9.763	163.9	4.45
1909.756	162.9	4.40

A and C (8.9)

1909.758	18°.7	110″.31
09.865	19.2	109.70
09.909	18.6	109.95
1909.844	18.8	109.99

The distance is less than in the original measures but there is probably no change.

32 O. Stone 1

R.A. $0^h\ 1^m\ 51^s$ Decl. − 14° 54′

All measures of this star should be credited to β G. C. **14**, Σ 3065 *rej.*

34 H 1938. BD + 74° (2)

R.A. $0^h\ 3^m\ 33^s$ Decl. + 74° 27′

1911.826	343°.7	20″.83
11.903	342.3	21.28
11.925	343.0	20.73
11.966	342.0	20.76
1911.905	342.8	20.90

Recent measures by Woods (*A. J.* 644) are in good agreement.

1910.70	342°.5	20″.83	4n	Woods

36 H 1939

R.A. $0^h\ 3^m\ 41^s$ Decl. + 10° 45′

1908.804	160°.6	34″.79	12
8.838	160.2	34.83	12
8.843	160.1	34.68	12
1908.828	160.3	34.77	

There are recent measures by β and Doolittle.

1908.76	160°.8	34″.78	2n	Doo
1909.87	161.3	34.72	2n	β

[Doolittle (*Pub. Flower Obsy.* IV) . . . β (*Carnegie Inst.* 168)]

Possibly decreasing angle.

38 Σ 5. 34 *Piscium*

R.A. $0^h\ 3^m\ 51^s$ Decl. + 10° 29′

1908.838	158°.3	7″.87	12
08.843	158.0	7.51	12
08.862	157.6	7.80	12
1908.848	158.0	7.73	

Without motion.

12758 Hu 1003. BD 66° (6) (8.7 ... 10.9)

R.A. $0^h\ 3^m\ 53^s$ Decl. + 66° 38′

1909.747	30°.4	2″.31
09.865	28.6	2.42
09.909	30.6	2.42
12.689	29.2	2.43
12.691	28.8	2.42
12.784	30.2	2.36
1909.840	29.9	2.38
1912.721	29.4	2.40

No indication of motion.

12759 A 801

R.A. $0^h\ 4^m\ 18^s$ Decl. + 74° 50′

1912.689	234°.0	2″.12
12.691	234.8	2.14
12.784	236.7	2.11
1912.721	235.2	2.12

No significant change.

44 Hu 503

R.A. $0^h\ 4^m\ 30^s$ Decl. + 49° 17′

A and B

1909.758	30°.5	4″.57
09.763	31.9	4.21
09.766	32.5	4.01
1909.762	31.6	4.26

A and C (11.2)

1909.758	55°.9	40″.91
09.766	56.3	40.97
1909.762	56.1	40.94

Fixed. No prior measures of C.

45 Kr 1

R.A. $0^h\ 4^m\ 38^s$ Decl. + 57° 10′

1911.755	185°.8	2″.08
11.793	192.2	2.14
11.796	189.1	2.12
1911.781	189.0	2.11

The distance may be slowly increasing. More measures are needed.

.... BD 43° (12) (8.7 ... 9.6)

R.A. 0^{h} 4^{m} 56^{s} Decl. + 43° 38′

1909.747	332°.8	9″.62
09.758	331.1	9.79
09.824	331.0	9.78
1909.776	331.6	9.73

sf 28 = H 1001.

52 β 254

R.A. 0^{h} 5^{m} 14^{s} Decl. + 59° 6′

1909.865	238°.9	7″.33
9.909	236.6	7.00
9.967	234.1	7.52
9.994	233.5	7.49
1909.934	235.8	7.33

No change.

53 Ho 1

R.A. 0^{h} 5^{m} 15^{s} Decl. + 28° 56′

1908.799	168°.2	1″.17	40
8.971	167.4	1.05	12
9.140	172.4	1.04	12
1908.970	169.3	1.09	

Fixed.

56 OΣ 1

R.A. 0^{h} 5^{m} 27^{s} Decl. + 65° 28′

1908.564	202°.7	1″.49	40
8.785	203.6	1.50	12
8.793	206.2	1.61	40
1908.714	204.2	1.53	

Entirely fixed.

60 H 1943

R.A. 0^{h} 5^{m} 37^{s} Decl. + 19° 12′

1912.798	235°.8	12″.33
12.836	237.8	12.21
12.839	237.4	12.18
1912.824	237.0	12.24

There are other stars near. One of $13^{m}.2$ in 50° : 14″ and one of $12^{m}.2$ in 248°.5 : 56″. No change in the Herschel pair.

70 A and C = H 1007

R.A. 0^{h} 7^{m} 11^{s} Decl. + 26° 19′

1907.720	225°.4	17″.76	12
7.755	223.3	17.99	12
7.758	224.2	17.64	12
1907.744	224.3	17.80	

No change.

77 Hu 504

R.A. 0^{h} 7^{m} 44^{s} Decl. + 48° 39′

1911.755	262°.2	2″.43
11.793	257.8	2.26
11.796	263.3	2.17
11.823	262.8	2.23
1911.792	261.5	2.27

As yet there is no motion.

92 Σ 13. *Cephei* 318

R.A. 0^{h} 9^{m} 25^{s} Decl. + 76° 17′

1911.725	79°.4	0″.72
11.949	77.4	0.66
12.727	80.1	0.81
1912.134	79.0	0.73

There are several recent observations. The character of the motion has been somewhat uncertain. The star has now definitely rounded the turn, but it will still be many years before the period is determinable.

93 H 1009. BD + 47° (40)

R.A. 0^{h} 9^{m} 39^{s} Decl. + 47° 55′

A and B

1911.796	28°.7	16″.40
11.823	28.4	16.31
11.826	29.9	16.37
1911.815	29.0	16.36

A and C (10.5)

1911.796	142°.2	37″.10
11.823	142.7	36.88
11.826	142.7	37.17
1911.815	142.5	37.05

There are no other recent measures. Fixed.

97 H 1010. BD + 59° (25)

R.A. 0^{h} 9^{m} 48^{s} Decl. + 59° 28′

1911.796	116°.2	19″.92
11.966	115.7	19.68
1911.881	116.0	19.80

1907.98	116°.0	19.77	4n	Bies

[Van Biesbroeck (*Ann. Observ. Belgique,* N. S. XIII)]

Probably unchanged.

98 H 1011. BD + 56° (28)

R.A. $0^{h}\ 8^{m}\ 33^{s}$ Decl. + 56° 40′

1911.796	104°.8	11″.16
11.966	104.2	11.19
1911.881	104.5	11.17

1908.54 104°.0 9″.90 3n Bies
[Van Biesbroeck (*Ann. Observ. Belgique*, N. S. XIII)]

Probably unchanged.

.... Anon. (10.4 ... 11.0)

R.A. $0^{h}\ 9^{m}\ 54^{s}$ Decl. + 48° 35′

A and B

1908.884	38°.1	14″.41	12
08.887	36.6	13.57	40
09.967	36.7	13.80	
1909.246	37.1	13.93	

A and C (11.4)

1908.884	292°.7	32″.36	12
08.887	292.7	32.49	40
09.967	292.1	31.74	
1909.246	292.5	32.20	

Near **125** = Es 41. 18ˢ *f* and 109″ *s* of BD 48° (55).

102 Σ 16

R.A. $0^{h}\ 10^{m}\ 19^{s}$ Decl. + 54° 0′

1908.879	37°.8	5″.85
08.882	36.5	5.72
08.884	37.1	5.66
1908.882	37.1	5.74

Entirely fixed.

103 Hu 405

R.A. $0^{h}\ 10^{m}\ 23^{s}$ Decl. + 23° 54′

1911.656	275°.8	1″.13
11.659	274.9	1.22
11.722	271.7	1.10
1911.679	274.1	1.15

No change.

108 H 2

R.A. $0^{h}\ 10^{m}\ 42^{s}$ Decl. + 11° 52′

1911.714	159°.7	20″.70
11.766	160.1	20.55
11.826	162.0	20.83
11.834	160.0	20.36
1911.785	160.4	20.61

Probably unchanged.

12766 A 904. BD 56° (32) (8.8 ... 9.5)

R.A. $0^{h}\ 10^{m}\ 47^{s}$ Decl. + 56° 56′

1911.796	0°.1	3″.72
11.966	0.2	3.53
12.680	356.5	3.55
12.689	359.7	3.64
12.691	358.0	3.74
1912.364	358.9	3.64

Probably unchanged.

111 Hu 3

R.A. $0^{h}\ 10^{m}\ 52^{s}$ Decl. − 11° 0′

1911.665	112°.2	1″.63
11.670	108.7	1.71
11.708	109.9	1.77
1911.681	110.3	1.70

1910.74 108°.0 1″.24 3n Doo
[Doolittle (*Pub. Flower Obsy.* IV)]

The measures of distance are erratic. The angle may be increasing.

114 Weisse 1

R.A. $0^{h}\ 11^{m}\ 10^{s}$ Decl. + 35° 10′

1909.597	104°.2	5″.47	40
09.636	286.2	5.45	40
09.655	104.8	5.33	40
1909.629	105.1	5.42	

Entirely fixed.

117 Σ 21 *rej.*

R.A. $0^{h}\ 11^{m}\ 14^{s}$ Decl. + 1° 39′

1907.772	49°.3	8″.48	12
7.777	48.0	7.45	12
7.788	52.2	7.31	12
1907.779	49.8	7.75	

Measures of this pair date from 1903. No change.

118 Σ 23

R.A. $0^{h}\ 11^{m}\ 20^{s}$ Decl. − 0° 21′

1907.772	331°.4	5″.16	12
7.777	330.8	5.20	12
7.788	330.6	5.17	12
1907.779	330.9	5.18	

Rectilinear motion given by Burnham as 0″.121 in 15°.1.

120 H 3

R.A. 0^{h} 11^{m} 42^{s} Decl. + 12° 23′

1911.714	262°3	11″90
11.758	82.4	11.77
11.766	262.7	11.83
1911.746	262.5	11.83

The measures are in good agreement with the recent ones of Doolittle.

125 Es 41 (8.0 ... 11.2)

R.A. 0^{h} 12^{m} 1^{s} Decl. + 48° 51′

1908.879	219°2	5″87	40
08.884	218.3	6.02	12
08.887	219.3	6.08	40
09.747	216.2	6.10	
09.994	217.2	6.23	
1909.278	218.0	6.06	

Espin's original measures give a smaller distance. The β measures of 1906 are intermediate. There may be change.

129 H 1012. BD 58° (29)

R.A. 0^{h} 12^{m} 49^{s} Decl. + 58° 44′

1911.796	9°2	14″47
11.826	9.7	14.28
11.966	8.8	14.37
1911.863	9.2	14.37

1908.07 9°7 14″49 3n Bies

[Van Biesbroeck (*Ann. Observ. Belgique*, N. S. XIII)]

If this star has been properly identified there has been change. See H 1013 immediately following.

130 H 1013

R.A. 0^{h} 12^{m} 22^{s} Decl. + 58° 43′

1911.796	328°5	14″39
11.826	328.9	14.22
11.966	327.7	14.20
1911.863	328.4	14.27

Not in BD. Probably no change in H 1013.

A of **129** to B of **130**

1911.966	114°0	63″99
12.689	114.2	63.81
1912.227	114.1	63.90

137 Kr 4

R.A. 0^{h} 12^{m} 45^{s} Decl. + 59° 2′

1909.826	186°7	2″34
09.865	186.7	2.29
09.900	186.7	2.27
1909.864	186.7	2.30

1910.637 188°4 2″66 5n Voûte

[Voûte (*A. N.* 4486)]

The angle is perhaps slowly decreasing and the distance increasing.

147 H 1955 (... 12.5)

R.A. 0^{h} 13^{m} 55^{s} Decl. + 5° 38′

A and B

1909.711	29°5	49″98
09.717	30.4	.....
09.758	29.5	50.86
09.838	28.8	50.46
10.969	29.6	50.31
1909.999	29.6	50.40

A and C (12.6)

1909.758	9°6	60″96
09.838	8.5	60.90
10.969	9.7	61.38
1910.288	9.3	61.08

151 A. Clark 1

R.A. 0^{h} 14^{m} 35^{s} Decl. + 32° 19′

1908.564	285°0	1″35	40
08.660	284.0	....	40
08.717	282.2	1.40	40
08.788	281.7	0.98	12
1908.682	283.2	1.24	

1910.827 283°5 1″40 2n Lau

[Lau (*A. N.* 4488)]

Angle and distance are both increasing, the motion being sensibly rectilinear. If the motion is orbital the orbit will probably have small inclination to the line of vision.

153 β 1093

R.A. 0^{h} 14^{m} 44^{s} Decl. + 10° 19′

1911.659	75°3	0″41
12.823	74.4	0.41
1912.241	74.8	0.41

Fairly rapid direct motion.

155 H 1956. BD 5° (37)

R.A. $0^{h}\ 14^{m}\ 47^{s}$ Decl. + 5° 48′

1911.826	27°.3	17″.57
11.873	27.1	17.51
12.628	26.2	17.58
1912.109	26.9	17.55

Probably fixed.

12772 Hu 1006

R.A. $0^{h}\ 15^{m}\ 5^{s}$ Decl. + 65° 8′

1912.680	196°.2	3″.15
12.689	194.0	3.10
12.691	194.3	3.24
1912.687	194.8	3.16

No change as yet.

166 Es 115

R.A. $0^{h}\ 16^{m}\ 18^{s}$ Decl. + 61° 34′

1911.755	83°.6	9″.62
11.793	83.0	9.53
11.796	83.7	9.50
1911.781	83.4	9.55

No motion.

.... BD 59° (43) (9.7 ... 11.0)

R.A. $0^{h}\ 16^{m}\ 33^{s}$ Decl. + 59° 38′

1909.826	150°.5	7″.17
09.865	149.5	6.69
09.909	146.9	....
09.967	150.6	7.00
09.994	151.7	7.09
15.640	150.8	6.95
15.665	150.9	7.02
1909.912	149.8	6.99
1915.652	150.8	6.99

173 H 1022 (8.5 ... 10.5)

R.A. $0^{h}\ 16^{m}\ 49^{s}$ Decl. + 51° 5′

1911.599	28°.7	5″.89
11.706	29.7	5.79
11.722	30.5	5.73
1911.676	29.6	5.80

The angle seems to be increasing. H calls the pair "elegant." I note the colors as yellow and blue.

187 H 1025

R.A. $0^{h}\ 18^{m}\ 33^{s}$ Decl. − 8° 35′

1912.697	136°.9	23″.97
12.746	135.1	24.07
12.749	135.9	24.07
1912.730	136.0	24.04

No significant change.

197 OΣ 9

R.A. $0^{h}\ 19^{m}\ 40^{s}$ Decl. + 56° 7′

1909.717	52°.7	1″.68
09.736	49.2	2.11
09.741	49.9	1.99
1909.733	50.6	1.93

The measures give the angle considerably smaller than other recent observations. Change is uncertain, though the distance is consistently larger in late measures.

200 β 778

R.A. $0^{h}\ 19^{m}\ 43^{s}$ Decl. + 51° 10′

1911.599	223°.0	1″.21
11.706	47.9	1.24
11.722	46.7	1.32
1911.676	45.9	1.26

As yet no change is apparent.

213 Hu 907

R.A. $0^{h}\ 21^{m}\ 16^{s}$ Decl. + 49° 22′

A and B

1911.722	127°.4	1″.50
11.725	129.6	1.53
11.949	131.1	1.52
11.966	130.3	1.53
1911.840	129.6	1.52

A and C

1911.722	183°.0	1″.65
11.725	183.6	1.62
11.966	183.7	1.69
1911.804	183.4	1.65

B and C

1911.722	240°.3	1″.38
11.725	240.6	1.37
11.949	238.7	....
11.966	238.5	1.47
1911.840	239.5	1.41

A and D

1911.725	267°.8	19″.47
12.730	267.1	19.69
1912.227	267.4	19.58

This is a beautiful triple. A, B, and C form a nearly perfect equilateral triangle. For D there are no earlier measures.

216 H 1968

R.A. $0^h\ 21^m\ 33^s$ Decl. − 17° 4′

A and B

1911.873	203°.4	3″.99
12.836	204.0	4.13
12.839	204.2	3.98
1912.516	203.9	4.03

A and C

1912.836	123°.4	90″.44
12.839	124.2	90.55
1912.837	123.8	90.50

The change is due to proper motion. See β (*Carnegie Inst.* 168).

220 O. Stone 2

R.A. $0^h\ 21^m\ 44^s$ Decl. − 17° 37′

1909.597	273°.7	6″.02	40
09.725	272.8	6.22	
09.838	273.0	6.05	
1909.720	273.2	6.10	

Change is uncertain.

240 Kr 7

R.A. $0^h\ 23^m\ 48^s$ Decl. + 59° 2′

1912.754	5°.9	3″.96
12.760	7.2	4.05
12.784	7.6	4.04
1912.766	6.9	4.02

No certain change.

246 = **269** Es 2

R.A. $0^h\ 24^m\ 30^s$ Decl. + 56° 8′

1909.717	112°.7	6″.01
09.736	113.1	5.88
09.739	113.2	5.77
1909.731	113.0	5.89

Fixed. The identity of β G. C. **246** and **269** was noted in *A. J.* 611.

248 Σ 32. 49 *Piscium*

R.A. $0^h\ 24^m\ 33^s$ Decl. + 15° 22′

1912.790	103°.7	20″.15
12.880	104.9	20.17
12.883	103.9	19.62
1912.851	104.2	19.98

Proper motion.

249 Σ 33

R.A. $0^h\ 24^m\ 36^s$ Decl. + 33° 26′

1912.790	26°.7	2″.78
12.820	25.9	2.88
12.856	26.5	2.82
1912.822	26.4	2.83

No change.

250 Es 116

R.A. $0^h\ 24^m\ 36^s$ Decl. + 54° 59′

1912.754	76°.6	7″.45
12.760	256.1	7.49
12.784	256.8	7.51
1912.766	256.5	7.48

Fixed.

260 OΣ 12. λ *Cassiopeiae*

R.A. $0^h\ 25^m\ 9^s$ Decl. + 53° 52′

1912.801	154°.9	0″.54
15.596	158.0	0.54(a)
15.599	156.6	0.52
1914.665	156.5	0.53

(a) A appears persistently elongated in direction of 200°.

A recognized binary.

264 Σ 35

R.A. $0^h\ 25^m\ 29^s$ Decl. − 2° 42′

1908.876	265°.9	8″.67	12
08.879	264.9	8.61	40
08.882	85.0	8.72	12
1908.879	265.3	8.67	

Relatively fixed.

269 Es 2

R.A. $0^h\ 24^m\ 30^s$ Decl. + 56° 8′

See **246**.

271 β 780

R.A. $0^h\ 26^m\ 0^s$ Decl. $+37°\ 5'$

1909.597	136°4	2″77	40
09.636	136.4	2.64	40
09.655	136.8	2.58	40
1909.629	136.5	2.66	

No material change.

275 H 1982. 52 *Piscium*

R.A. $0^h\ 26^m\ 18^s$ Decl. $+19°\ 38'$

1912.790	302°6	42″69
12.880	303.1	42.83
1912.835	302.8	42.76

From the micrometric measures β gives the proper motion as 0″149 in 103°2. See *Carnegie Inst.* 168.

.... BD 29° (98) (8.9 ... 10.7)

R.A. $0^h\ 26^m\ 34^s$ Decl. $+29°\ 26'$

1912.790	26°4	22″11
12.880	26.2	22.11
12.883	26.6	21.96
1912.851	26.5	22.06

North of **280** = A. G. 3.

280 A. G. 3

R.A. $0^h\ 26^m\ 35^s$ Decl. $+29°\ 27'$

1912.856	29°9	4″39
12.880	32.5	4.47
12.883	32.3	4.56
1912.873	31.6	4.47

Fixed.

297 = **326** Es 3

R.A. $0^h\ 28^m\ 17^s$ Decl. $+55°\ 56'$

1908.879	155°6	7″96	40
08.884	156.3	8.16	12
08.971	157.9	8.12	12
09.717	156.5	8.18	
09.736	156.6	8.13	
09.739	157.4	8.28	
1909.321	156.7	8.14	

The identity of β G. C. **297** and **326** was pointed out in *A. J.* 611. The recent measures make the distance less. See β (*Carnegie Inst.* 168).

321 Hd 28

R.A. $0^h\ 29^m\ 27^s$ Decl. $+2°\ 40'$

1912.880	340°2	22″84
12.883	340.7	22.97
13.036	339.7	22.99
1912.933	340.2	22.93

No earlier measures.

326 Es ...

R.A. $0^h\ 28^m\ 17^s$ Decl. $+55°\ 56'$

See **297**.

338 Hd 30 (9.2 ... 10.2)

R.A. $0^h\ 31^m\ 41^s$ Decl. $+2°\ 21'$

1909.763	39°7	6″56
09.835	38.7	6.57
09.838	39.9	7.06
12.798	42.3	6.40
12.880	42.4	6.38
12.883	43.8	6.31
1911.333	41.1	6.54

The measures are somewhat erratic but no change is probable.

349 OΣ 16

R.A. $0^h\ 32^m\ 32^s$ Decl. $+48°\ 42'$

1909.709	24°1	13″85
09.736	21.0	13.96
09.739	24.0	13.93
09.758	22.1	14.13
1909.735	22.8	13.97

Probably slow change in distance.

.... A 2203. BD 2° (85)

R.A. $0^h\ 33^m\ 18^s$ Decl. $+2°\ 39'$

1910.750	118°3	2″36		
10.829	121.2	2.67		
10.884	119.3	2.49		
1910.821	119.6	2.51		
1910.69	118°0	2″40	2n	A

[Aitken (*Bull. L. O.* 188)]

368 Σ 49

R.A. $0^h\ 34^m\ 42^s$ Decl. $-7°\ 53'$

1908.564	319°1	6″66	40
08.604	319.4	6.69	40
08.717	320.2	6.79	40
1908.628	319.6	6.71	

Increase in distance from proper motion.

374 OΣ 18

R.A. $0^h\ 36^m\ 12^s$ Decl. + 3° 31′

1908.564	138°.9	....	40
08.717	139.9	1″.14	40
08.838	137.4	1.01	12
1908.706	138.7	1.08	

It is still uncertain whether the motion is rectilinear or orbital.

392 Σ 55

R.A. $0^h\ 37^m\ 55^s$ Decl. + 32° 58′

1909.597	323°.8	2″.24	40
09.636	323.5	2.10	40
09.655	324.3	2.23	40
1909.629	323.9	2.19	

No change.

397 = 400, A. G. 7 = H 6

R.A. $0^h\ 38^m\ 8^s$ Decl. + 11° 56′

1908.917	317°.6	21″.44	12
08.971	316.8	21.07	12
1908.944	317.2	21.25	

The identity of these two pairs was noted in *A. N.* 4336. See also Doolittle (*Pub. Flower Obsy.* IV) and β (*Carnegie Inst.* 168). No change.

408 H 7. BD 11° (90)

R.A. $0^h\ 39^m\ 17^s$ Decl. + 11° 51′

1908.884	306°.8	21″.13	12
08.887	308.4	20.97	40
08.971	306.4	20.87	12
1908.914	307.2	20.99	

Doolittle's corrected R.A. is 10ˢ in error.

413 Muller 3

R.A. $0^h\ 39^m\ 42^s$ Decl. − 17° 5′

1909.578	192°.9	3″.05	40
09.758	192.1	2.94	
1909.668	192.5	2.99	

The measures are few and erratic. No certain conclusion can be drawn from them.

426 Σ 60. *η Cassiopeiae*

R.A. $0^h\ 41^m\ 43^s$ Decl. + 57° 11

1909.739	238°.6	6″.13
09.742	241.6	6.43
09.744	240.6	6.29
09.747	240.8	6.17
1909.743	240.4	6.25

A well-known binary. The periods of the various computed orbits are in wild disagreement. Many recent measures.

432 Hd 35

R.A. $0^h\ 42^m\ 28^s$ Decl. − 2° 25′

1908.876	34°.4	6″.84	12
08.882	35.1	7.45	12
08.884	36.6	7.21	12
1908.881	35.4	7.17	

Fixed.

433 H 1054 (8.5 ... 11.3)

R.A. $0^h\ 42^m\ 31^s$ Decl. + 60° 6′

A and B

1909.739	180°.9	8″.95
09.742	178.2	8.77
09.744	181.8	8.86
09.747	178.5	8.90
1909.743	179.8	8.87

No change in AB.

A and C (10.0)

1909.739	62°.3	93″.00
09.742	62.0	93.11
09.744	62.0	.....
09.747	61.8	92.82
1909.743	62.0	92.98

C and D (11.4)

1909.739	236°.3	25″.85
09.742	236.6	25.54
09.747	236.6	25.79
1909.743	236.5	25.73

No prior measures of C and D.

439 Σ 61. 65 *Piscium.*

R.A. $0^h\ 43^m\ 26^s$ Decl. + 27° 3′

1907.772	296°.9	4″.46	12
07.777	297.0	4.32	12
07.788	116.4	4.47	12
1907.779	296.8	4.42	

No significant change.

446 Ho 4

R.A. 0ʰ 44ᵐ 10ˢ Decl. + 33° 18′

1909.597	21°.7	1″.85	40
09.636	20.7	1.89	40
09.655	19.6	1.78	40
1909.629	20.7	1.84	

No appreciable change.

455 *β* 1

R.A. 0ʰ 45ᵐ 50ˢ Decl. + 55° 58′

A and B

1909.739	75°.6	1″.44
09.747	79.3	1.45
09.865	78.7	1.37
09.909	79.7	1.50
1909.815	78.3	1.44

A and C

1909.739	132°.3	4″.07
09.747	130.9	3.77
09.824	132.4	4.30
09.909	130.7	4.02
1909.805	131.6	4.04

A and D

1909.739	192°.7	8″.84
09.747	192.8	9.01
09.824	193.0	9.14
09.909	193.3	9.08
1909.805	192.9	9.02

A very pretty triple. As yet there is no motion.

456 Σ 67

R.A. 0ʰ 45ᵐ 52ˢ Decl. + 9° 57′

1907.777	360°.0	2″.11	12
07.788	359.7	2.13	12
08.838	358.7	1.94	12
09.597	359.3	2.11	40
09.973	359.8	2.09	
1908.795	359.5	2.08	

The angle is very slowly decreasing and the distance perhaps increasing. There are recent measures by Doberck, Voûte, Bowyer, Doolittle.

460 A. G. 8

R.A. 0ʰ 45ᵐ 59ˢ Decl. + 67° 56′

1909.739	33°.8	17″.78
09.747	34.6	17.56
09.758	213.9	17.61
1909.748	34.1	17.65

No change.

463 O. Stone 3

R.A. 0ʰ 46ᵐ 20ˢ Decl. − 23° 16′

A and B

1908.838	266°.6	2″.26	12
08.862	265.9	2.09	12
08.876	265.4	2.12	12
08.884	263.7	2.24	12
1908.865	265.4	2.18	

A and C (12.0)

1908.876	196°.4	32″.81	12
08.884	195.6	32.44	12
1908.880	196.0	32.62	

The angle is decreasing. The pair has a considerable proper motion. The star C was connected for an independent determination of the proper motion.

470 Hd 37 = Ku 7

R.A. 0ʰ 47ᵐ 17ˢ Decl. + 2° 39′

1912.579	232°.7	1″.40
12.628	230.0	1.48
12.680	233.2	1.47
1912.629	232.0	1.45

1896.81	233°.3	1″.17	3n	A
1909.87	231.5	1.18	2n	Doo

[Aitken (*Pub. L. O.* XII) . . . Doolittle (*Pub. Flower Obsy.* IV)]

Fixed.

474 Σ 69

R.A. 0ʰ 47ᵐ 51ˢ Decl. + 83° 2′

1909.845	15°.4	24″.20
09.856	15.8	23.62(a)
09.900	....	23.97
09.967	14.7	23.76
1909.892	15.3	23.89

(a) Single distance.

Proper motion.

479 OΣ 20. 66 *Piscium*

R.A. $0^h\ 48^m\ 14^s$ Decl. + 18° 32′

1910.722	310°5	0″42
10.971	304.7	0.43
10.659	306.9	0.53
1910.784	307.4	0.46

The character of the motion is still uncertain but is probably orbital.

482 Σ 73. 36 *Andromedae*

R.A. $0^h\ 48^m\ 32^s$ Decl. + 22° 59′

1910.722	30°7	1″08
10.750	31.9	0.96
10.936	31.8	1.10
1910.803	31.5	1.05

A system recognized as a binary from the earliest comparison of measures. Many recent measures.

486 H 629 (8.6 ... 11.0)

R.A. $0^h\ 48^m\ 59^s$ Decl. + 33° 54′

A and B

1909.597	69°7	11″07	40
09.636	70.4	10.86	40
09.666	70.2	10.60	40
09.725	70.2	10.73	
1909.656	70.1	10.81	

A and C (8.3)

1909.636	254°6	70″69	40
09.725	254.8	70.73	
1909.680	254.7	70.71	

A is BD 33° (130). No change in the system. Compare β (*Carnegie Inst.* 168).

490 Howe 1

R.A. $0^h\ 49^m\ 52^s$ Decl. − 17° 1′

1910.763	118°5	1″74
10.766	119.1	1.80
10.971	121.4	1.80
1910.833	119.7	1.78

The angle is increasing slowly. See Doberck (*A. N.* 4130) and Olivier (*A. N.* 4166).

499 Σ 76

R.A. $0^h\ 50^m\ 19^s$ Decl. + 10° 1′

1909.636	197°5	3″05	40
09.973	194.7	3.18	
1909.804	196.1	3.11	

Fixed.

519 Σ 80

R.A. $0^h\ 53^m\ 15^s$ Decl. + 0° 8′

1907.772	321°0	21″94	12
07.788	320.1	21.95	12
07.807	319.7	22.20	12
1907.789	320.3	22.03	

Rectilinear motion.

547 See 10

R.A. $0^h\ 56^m\ 33^s$ Decl. − 22° 15′

1910.763	319°6	4″67
10.766	320.1	4.84
10.895	318.7	4.79
1910.808	319.5	4.77

No change.

556 Σ 85 *rej.*

R.A. $0^h\ 58^m\ 20^s$ Decl. − 5° 57′

A and B

1909.597	158°7	29″16	40
09.636	158.9	29.29	40
09.725	158.7	29.25	
1909.653	158.8	29.23	

A and C

1909.597	117°4	.....	40
09.636	117.4	34″32	40
09.725	117.2	34.27	
1909.653	117.3	34.29	

Both distances are larger than in 1902. See β (*Carnegie Inst.* 168).

560 Σ 86

R.A. $0^h\ 58^m\ 43^s$ Decl. − 6° 7′

1908.785	153°1	13″53	12
08.799	153.1	13.65	40
08.804	154.4	13.46	12
09.636	152.6	13.70	40
09.578	152.8	13.73	40
09.725	153.1	13.61	
1909.221	153.1	13.61	

Both angle and distance show change.

568 Σ 87

R.A. $0^{h}\ 59^{m}\ 9^{s}$ Decl. + 14° 45′

1908.785	196°.1	6″.73	12
08.804	196.2	6.65	12
08.838	196.1	6.53	12
1908.809	196.1	6.64	

Without motion.

578 Σ 89 *rej.* BD 79° (31) (8.5 ... 10.5)

R.A. $1^{h}\ 0^{m}\ 15^{s}$ Decl. + 79° 42′

1909.845	340°.9	15″.79
10.758	339.8	16.00
10.777	340.0	15.86
1910.460	340.2	15.88

The measure made at Cincinnati quoted in β G. C. II perhaps belongs to **12706** = Σ 3051 which is 1^{h} preceding.

591 Σ 91

R.A. $1^{h}\ 1^{m}\ 2^{s}$ Decl. − 2° 22′

1907.758	319°.7	....	12
07.772	318.9	4″.13	12
07.788	319.9	4.09	12
08.804	319.3	4.29	12
1908.030	319.4	4.17	

The angle is slowly decreasing.

608 A. G. 15

R.A. $1^{h}\ 3^{m}\ 2^{s}$ Decl. + 39° 32′

1910.832	244°.7	2″.78
11.563	70.1	2.79
11.577	249.0	2.85
11.591	247.2	2.88
1911.391	247.8	2.82

Probably unchanged.

615 Hu 602

R.A. $1^{h}\ 3^{m}\ 32^{s}$ Decl. + 33° 36′

1910.832	201°.5	4″.30
10.947	199.0	4.29
10.961	200.7	4.13
1910.913	200.4	4.24

Unchanged.

617 β 2

R.A. $1^{h}\ 3^{m}\ 46^{s}$ Decl. + 29° 14′

1910.832	151°.4	2″.12
10.947	153.6	1.97
10.961	151.0	2.11
1910.913	152.0	2.07

Immobile.

618 H 2023

R.A. $1^{h}\ 3^{m}\ 51^{s}$ Decl. + 20° 52′

1908.838	27°.6	4″.35	12
08.884	28.7	3.99	12
09.636	30.7	4.38	40
09.975	29.9	3.99	
1909.333	29.2	4.18	

No measures prior to 1902.

620 Σ 94

R.A. $1^{h}\ 3^{m}\ 56^{s}$ Decl. + 15° 57′

1909.666	95°.9	19″.81	12
09.725	95.6	19.72	
09.742	96.1	19.89	
1909.711	95.9	19.81	

The distance is increasing slowly.

636 H 2025. BD 52° (277) (9.8 ... 9.8)

R.A. $1^{h}\ 5^{m}\ 28^{s}$ Decl. + 52° 33′

A and B

1909.824	56°.8	11″.65
09.826	59.0	11.58
09.845	57.3	11.62
1909.832	57.7	11.62

Probably unchanged.

A and C (9.5)

1909.824	316°.5	78″.59
09.826	316.3	78.47
09.845	316.5	78.24
1909.832	316.4	78.43

No prior measures of C, which is BD 52° (276).

12832 Hu 1023

R.A. $1^h\ 5^m\ 48^s$ Decl. + 64° 59′

1912.689	357°.8	3″.87
12.691	357.5	3.80
12.727	358.4	3.87
1912.702	357.9	3.85

From these measures the angle is smaller. More observations are needed.

640 Skinner 1 (... 9.8)

R.A. $1^h\ 6^m\ 8^s$ Decl. − 14° 16′

1910.763	250°.4	8″.35
10.766	250.6	8.35
10.769	250.0	8.47
1910.766	250.3	8.39

The measures are in close agreement with Doolittle (*Pub. Flower Obsy.* IV) and indicate decreasing distance.

647 Σ 99. *φ Piscium*

R.A. $1^h\ 7^m\ 14^s$ Decl. + 23° 57′

1910.753	224°.7	7″.89
10.763	224.8	7.82
10.766	225.6	7.88
1910.761	225.0	7.86

No change. β adds a distant star. See *Carnegie Inst.* 168.

649 H 2028

R.A. $1^h\ 7^m\ 36^s$ Decl. + 73° 23′

1909.900	203°.4	61″.30
09.958	203.4	61.07
09.967	204.2	61.13
1909.942	203.7	61.17

No change. Common proper motion.

653 Σ 101

R.A. $1^h\ 7^m\ 54^s$ Decl. − 8° 15′

1907.772	342°.2	21″.61	12
07.788	342.4	21.26	12
08.804	342.6	21.28	12
08.843	342.0	.....	12
1908.302	342.4	21.38	

No significant change.

655 Σ 3 (App) 1. 37 *Ceti*

R.A. $1^h\ 8^m\ 21^s$ Decl. − 8° 34′

1907.772	331°.3	49″.65	12
07.788	331.4	49.56	12
08.804	331.2	49.90	12
1908.121	331.3	49.70	

No relative change. Common proper motion.

12838 Hu 1025

R.A. $1^h\ 8^m\ 27^s$ Decl. + 68° 3′

1912.689	193°.7	2″.91
12.691	194.4	3.00
12.727	195.2	3.01
1912.702	194.4	2.97

These measures make the angle less but change is uncertain.

12839 Hu 1026

R.A. $1^h\ 8^m\ 59^s$ Decl. + 49° 26′

1912.689	220°.2	4″.10
12.762	221.3	4.13
12.839	222.8	4.23
1912.763	221.4	4.15

No certain change.

660 Howe 2

R.A. $1^h\ 9^m\ 34^s$ Decl. − 23° 33′

1909.758	141°.0	14″.93
09.867	139.3	14.91
09.975	141.3	14.84
1909.867	140.5	14.89

No change.

662 β 3

R.A. $1^h\ 9^m\ 39^s$ Decl. + 55° 52′

1908.971	27°.3	4″.51	12
09.112	27.1	4.46	12
09.140	26.3	4.64	12
1909.074	26.9	4.54	

No indication of motion.

677 Hd 45

R.A. $1^h\ 10^m\ 59^s$ Decl. + 1° 23′

1909.758	99°.9	36″.76
09.763	99.8	37.23
09.838	100.2	36.88
1909.786	100.0	36.96

No measures prior to 1904.

681 Howe 3

R.A. $1^h\ 11^m\ 18^s$ Decl. $-23°\ 52'$

1909.742	285°.4	7″.79
09.758	287.6	7.84
09.867	287.0	8.10
1909.789	286.7	7.91

Fixed.

684 Kr 11

R.A. $1^h\ 11^m\ 56^s$ Decl. $+60°\ 57'$

1908.971	59°.3	1″.87	12
09.112	237.7	1.87	12
09.140	56.9	2.12	12
1909.074	58.0	1.95	

The magnitudes are equal and the quadrant therefore uncertain. No motion.

686 Hd 47

R.A. $1^h\ 12^m\ 53^s$ Decl. $-23°\ 27'$

See **694** Hd 48.

690 H 5453

R.A. $1^h\ 12^m\ 29^s$ Decl. $-1°\ 29'$

1910.944	208°.4	27″.99
10.969	208.0	28.09
11.632	208.4	27.79
1911.182	208.3	27.96

No relative change. Large common proper motion.

694 Hd 48 = **686** Hd 47

R.A. $1^h\ 12^m\ 53^s$ Decl. $-23°\ 27'$

1909.867	60°.8	9″.75
09.975	60.5	9.57
09.991	60.8	10.09
1909.944	60.7	9.80

The identity of these pairs was noted in *A. J.* 611. The few measures are erratic. Probably no change.

706 Σ 112

R.A. $1^h\ 13^m\ 40^s$ Decl. $+45°\ 42'$

1910.810	330°.8	21″.83
10.832	330.6	21.75
11.574	330.9	21.65
1911.072	330.8	21.74

Angle increasing, distance diminishing.

743 β 1163. *Ceti* 199

R.A. $1^h\ 18^m\ 18^s$ Decl. $-7°\ 32'$

1911.659	214°.5	0″.30
12.823	208.0	0.38
1912.241	211.3	0.34

The "decided change in angle" noted in β G. C. is not confirmed by these observations. The change, if any, is very slow.

753 Σ 121

R.A. $1^h\ 19^m\ 29^s$ Decl. $+63°\ 51'$

1910.777	274°.4	13″.19
10.793	274.8	13.06
10.796	274.7	13.06
1910.789	274.6	13.10

There may be slow decrease in both angle and distance.

759 Σ 118

R.A. $1^h\ 20^m\ 38^s$ Decl. $+82°\ 44'$

1910.777	79°.2	12″.36
10.796	79.3	12.35
10.810	79.2	12.54
1910.794	79.2	12.42

Both angle and distance are increasing.

761 Σ 125

R.A. $1^h\ 20^m\ 50^s$ Decl. $-0°\ 46'$

1911.634	340°.7	44″.07
11.665	341.4	44.42
11.670	341.1	44.13
1911.656	341.1	44.21

Well determined, large proper motion.

12850 Hu 1029

R.A. $1^h\ 22^m\ 1^s$ Decl. $+62°\ 58'$

1912.691	218°.3	1″.72
12.727	219.6	1.83
12.730	223.0	1.76
1912.716	220.3	1.77

The interval is too short to reveal motion.

.... A 1909. BD 21° (199)

R.A. $1^h\ 23^m\ 1^s$ Decl. + 21° 19′

1914.616	123°.0	1″.91
15.637	123.5	1.83
1915.126	123.3	1.87

Detected as double on a photographic plate made with the 18½-inch.

Aitken's description is:

1908.91	127°.2	1″.67	3n	A

[Aitken (*Bull. L. O.* 158)]

779 Σ 129

R.A. $1^h\ 23^m\ 55^s$ Decl. + 12° 2′

1910.898	282°.0	8″.90
11.873	283.1	8.84
1911.385	282.5	8.87

No change.

780 Es 4

R.A. $1^h\ 23^m\ 59^s$ Decl. + 43° 0′

1910.810	99°.6	2″.94
10.832	99.2	3.19
11.563	100.6	3.15
1911.068	99.8	3.09

There may be some change in both angle and distance. More observations are needed.

786 A 441

R.A. $1^h\ 24^m\ 46^s$ Decl. − 8° 41′

1910.722	265°.7	1″.26
10.971	265.0	1.38
11.632	266.8	1.34
1911.108	265.8	1.33

No motion during the short interval since discovery.

792 Σ 131 (7.5 ... 9.8)

R.A. $1^h\ 25^m\ 17^s$ Decl. + 60° 4′

1910.777	141°.7	13″.83
10.810	142.2	13.89
10.832	141.2	13.91
1910.806	141.7	13.88

Fixed.

804 Σ 31

R.A. $1^h\ 27^m\ 1^s$ Decl. + 7° 36′

1910.763	79°.9	4″.32
10.763	80.0	4.44
10.782	78.8	4.33
1910.769	79.6	4.36

Probably slight decrease in angle.

807 H 640

R.A. $1^h\ 27^m\ 27^s$ Decl. − 4° 8′

1910.763	111°.0	5″.68
10.766	110.2	5.62
10.769	110.3	5.77
1910.766	110.5	5.69

I reverse the quadrant. Probably unchanged.

810 Howe 4

R.A. $1^h\ 27^m\ 47^s$ Decl. − 12° 50′

1911.659	314°.2	0″.56

If this single night's observation is reliable there is marked decrease in both angle and distance, indicating orbital motion.

811 Howe 5

R.A. $1^h\ 27^m\ 55^s$ Decl. − 12° 29′

1908.838	30°.9	13″.70	12
08.882	30.9	.....	12
08.884	32.0	13.50	12
09.867	30.5	13.37	
09.975	30.5	13.13	
1909.289	31.0	13.42	

Without motion.

813 Σ 136. 100 *Piscium*

R.A. $1^h\ 28^m\ 29^s$ Decl. + 11° 57′

1910.829	78°.6	15″.85
10.851	78.0	15.80
10.898	78.2	15.94
1910.859	78.3	15.86

No change. β adds distant stars. (*Carnegie Inst.* 168).

814 H 1084. BD 66° (137)

R.A. $1^{h}\ 28^{m}\ 40^{s}$ Decl. + 66° 37′

1910.810	355°.7	15″.39
11.634	355.2	15.28
11.755	356.2	15.39
1911.400	355.7	15.35

1911.62	357°.5	14″.83	3n	Bies

[Van Biesbroeck (*Ann. Observ. Belgique*, N. S. XIII)]

Schroeter identifies this star as BD 66° (137). No early measures.

817 H 2053

R.A. $1^{h}\ 28^{m}\ 50^{s}$ Decl. + 71° 58′

1910.810	28°.1	31″.91
11.634	28.2	31.89
11.755	28.4	31.79
1911.400	28.2	31.86

No early measures.

829 H 2056

R.A. $1^{h}\ 29^{m}\ 45^{s}$ Decl. + 77° 21′

1910.810	214°.8	33″.52
11.634	212.8	33.70
11.755	213.3	33.51
1911.400	213.6	33.58

No early measures. Faint star in 11° : 31″.7. Van Biesbroeck gives measures of this faint star. (*Ann. Observ. Belgique*, N. S. XIII).

830 Σ 138

R.A. $1^{h}\ 29^{m}\ 46^{s}$ Decl. + 7° 2′

1911.574	40°.7	1″.63
11.577	41.3	1.69
11.599	40.0	1.75
1911.583	40.7	1.69

The angle is slowly increasing. Probably binary but this is not yet certain.

838 Es 46

R.A. $1^{h}\ 31^{m}\ 2^{s}$ Decl. + 54° 37′

A and B

1911.634	35°.7	3″.32
11.665	36.7	3.32
11.717	37.9	3.31
1911.672	36.8	3.32

A and C

1911.634	288°.3	54″.37
11.665	288.1	54.34
11.717	288.1	54.31
1911.672	288.2	54.34

I make the distance for AC decidedly greater than in the original observations.

843 Σ 139

R.A. $1^{h}\ 31^{m}\ 44^{s}$ Decl. + 52° 21′

1910.832	40°.7	10″.17
11.563	222.8	10.06
11.577	221.3	10.09
1911.324	221.6	10.11

No change apparent.

851 β 783

R.A. $1^{h}\ 32^{m}\ 39^{s}$ Decl. + 73° 56′

1911.725	317°.9	1″.01
11.777	312.1	1.02
12.678	312.8	1.07
1912.060	314.3	1.03

As yet no motion.

853 H 17

R.A. $1^{h}\ 32^{m}\ 46^{s}$ Decl. + 11° 35′

1910.824	281°.3	8″.18
10.829	281.2	8.24
10.851	280.4	8.22
1910.835	281.0	8.21

No change.

854 β 5. 103 *Piscium*

R.A. $1^{h}\ 32^{m}\ 47^{s}$ Decl. + 16° 1′

1911.632	289°.4	1″.23
11.659	290.7	1.28
11.670	291.6	1.14
1911.654	290.6	1.22

Entirely fixed.

858 Kr 12

R.A. $1^{h}\ 33^{m}\ 19^{s}$ Decl. + 62° 4′

1911.673	119°.4	0″.60
11.725	304.4	0.65
11.777	299.4	0.59
1911.725	301.1	0.61

No change recognizable.

860 Σ 142

R.A. $1^h\ 33^m\ 28^s$ Decl. + 14° 39′

1910.824	349°.9	14″.22
10.829	350.1	14.17
10.851	350.3	14.11
1910.835	350.1	14.17

β connects a third star to detect which of the two has the large proper motion. (*Carnegie Inst.* 168).

862 Σ 143

R.A. $1^h\ 33^m\ 32^s$ Decl. + 33° 44′

A and B

1911.774	319°.4	37″.34
11.780	139.4	37.40
11.793	319.4	37.37
1911.782	319.4	37.37

Increase in distance due to proper motion.

A and C

1911.774	136°.7	70″.96
11.780	316.9	70.93
11.793	137.0	71.04
1911.782	136.9	70.98

There are no earlier measures of AC.

870 Σ 145

R.A. $1^h\ 34^m\ 36^s$ Decl. + 25° 8′

1910.944	33°.8	10″.83
10.947	30.7	10.91
10.969	30.8	10.83
1910.953	31.8	10.86

No decided movement.

871 Σ 146

R.A. $1^h\ 34^m\ 57^s$ Decl. + 9° 30′

1910.824	306°.1	24″.23
10.829	306.5	24.22
10.851	306.4	24.19
1910.835	306.3	24.21

The measures are very discordant for so easy a pair.

873 Hu 9

R.A. $1^h\ 35^m\ 25^s$ Decl. − 12° 45′

1910.824	292°.5	4″.75
10.829	293.2	4.79
10.851	293.4	4.84
1910.835	293.0	4.79

Apparently without change.

874 See 15

R.A. $1^h\ 35^m\ 28^s$ Decl. − 22° 20′

1910.824	309°.7	3″.13
10.829	311.9	2.86
10.851	312.1	3.13
1910.835	311.2	3.04

Unchanged.

876 H 642

R.A. $1^h\ 35^m\ 47^s$ Decl. + 1° 18′

1910.824	348°.0	28″.49
10.829	347.5	28.54
10.851	348.3	28.94
1910.835	347.9	28.66

Herschel's description is:

1820 +	310° ±	20″ ±

877 Σ 147. *χ′ Ceti*

R.A. $1^h\ 35^m\ 48^s$ Decl. − 11° 55′

1910.824	90°.1	3″.34
10.829	90.4	3.59
10.851	90.4	3.37
1910.835	90.3	3.43

Relative change is very uncertain. Common proper motion.

880 Hu 420

R.A. $1^h\ 35^m\ 51^s$ Decl. − 14° 56′

1911.632	234°.7	2″.43
11.670	234.9	2.45
11.774	236.2	2.39
1911.692	235.3	2.42

Interval too short to reveal motion.

884 OΣ 35

R.A. 1ʰ 36ᵐ 0ˢ Decl. + 55° 16′

1911.634	101°.9	11″.52
11.665	101.9	11.46
11.796	102.0	11.32
1911.698	101.9	11.43

Angle decreasing, distance increasing.

886 H 1089 (9.3 ... 10.0)

R.A. 1ʰ 36ᵐ 20ˢ Decl. + 71° 6′

A and B

1912.793	87°.9	27″.19
12.845	88.3	27.19
12.861	87.8	27.08
1912.833	88.0	27.15

A and C (11.0)

1912.845	27°.5	104″.65
12.861	27.4	104.83
1912.853	27.4	104.74

C and D (11.8)

1912.845	332°.4	9″.32
12.861	335.4	8.98
1912.853	333.9	9.15

No prior measures of C or D.

892 OΣ 34

R.A. 1ʰ 36ᵐ 43ˢ Decl. + 80° 17′

1912.730	322°.8	0″.35
1915.667	334.7	0.33

My angles evidently require a correction of 180°. Slow direct motion.

893 Δ 3

R.A. 1ʰ 37ᵐ 7ˢ Decl. + 56° 35′

1911.634	329°.2	3″.03
11.755	329.1	3.16
11.796	333.5	3.11
1911.728	330.6	3.10

No material motion.

898 Σ 149

R.A. 1ʰ 37ᵐ 24ˢ Decl. + 39° 21′

1911.591	98°.2	1″.63
11.722	100.4	1.44
11.774	102.0	1.56
1911.696	100.2	1.54

Retrograde motion.

903 Σ 148

R.A. 1ʰ 37ᵐ 36ˢ Decl. + 63° 13′

1911.725	138°.0	1″.02		
11.777	138.7	1.14		
11.793	139.6	1.11		
1911.765	138.8	1.09		
1909.82	143°.9	1″.21	3n	Do

[Doberck (*A. N.* 4394)]

I make the distance less than do most recent observers.

918 Hu 533

R.A. 1ʰ 39ᵐ 23ˢ Decl. + 50° 31′

1912.793	178°.5	1″.94
12.845	185.7	2.02
12.861	182.9	1.96
1912.833	182.4	1.97

No motion.

926 Σ 158

R.A. 1ʰ 39ᵐ 50ˢ Decl. + 32° 34′

1912.790	254°.5	2″.24
12.823	256.4	2.03
12.836	258.8	2.18
1912.816	256.6	2.15

A and C (12.8) in 256° : 55″, A and D (11.5) in 70° : 100″.

1909.86	260°.2	1″.95	3n	Doo
1910.33	257.8	2.07	3n	Do

[Doolittle (*Pub. Flower Obsy.* IV) . . . Doberck (*A. N.* 4479)]

Motion is very uncertain. The measures are discordant.

939 Es 5

R.A. 1ʰ 41ᵐ 35ˢ Decl. + 47° 50′

1912.913	100°.8	2″.89
12.951	100.3	2.73
12.973	99.6	2.86
1912.946	100.2	2.83

The angle is noticeably greater than in Espin's original measures.

941 Σ 162

R.A. $1^h\ 41^m\ 48^s$ Decl. + 47° 18′

A and B

1912.913	211°0	1″96
12.951	210.8	2.40
12.973	214.8	2.21
1912.946	212.2	2.19

Retrograde motion. Several recent observations.

A and C

1912.913	179°1	20″58
12.951	179.3	20.67
12.973	179.3	20.57
1912.946	179.2	20.61

974 Σ 175

R.A. $1^h\ 44^m\ 25^s$ Decl. + 20° 31′

1912.814	349°4	17″97
12.856	349.4	17.93
12.877	348.4	18.03
1912.849	349.1	17.98

Marked rectilinear motion.

981 Σ 178

R.A. $1^h\ 45^m\ 40^s$ Decl. + 10° 13′

1912.856	15°6	3″35
12.877	16.3	3.31
12.880	197.4	3.61
12.946	16.7	3.26
1912.890	16.5	3.38

The quadrant is uncertain. The measures are discordant for such an easy pair. Probably fixed.

982 Hu 805

R.A. $1^h\ 45^m\ 40^s$ Decl. + 33° 19′

A and B

1912.790	163°4	2″89
12.836	159.0	2.89
12.839	159.1	2.64
1912.822	160.5	2.81

Doolittle makes the distance 2″39 for 1909.94. The change is not verified.

A and C (12.0)

1912.790	257°2	10″66
12.836	257.2	10.71
12.839	257.2	10.67
1912.822	257.2	10.68

Other than Doolittle's there are no prior observations of AC.

1011 A. G. 25

R.A. $1^h\ 49^m\ 7^s$ Decl. + 35° 27′

1912.790	66°9	5″54
12.836	70.4	5.45
12.839	70.3	5.54
1912.822	69.2	5.51

Recent measures by Doberck, Lau, Doolittle. No change.

1015 Σ 186

R.A. $1^h\ 49^m\ 41^s$ Decl. + 1° 15′

1907.750	211°9	0″69	12
07.777	210.7	1.01	12
07.788	209.8	1.12	12
1907.772	210.8	0.94	

The angle requires a correction of 180°. A well-known binary.

1070 OΣ 38. γ *Andromedae* BC

R.A. $1^h\ 56^m\ 32^s$ Decl. + 41° 45′

1910.706	108°9	0″50
11.659	112.4	0.60
11.670	112.2	0.56
11.673	113.1	0.53
12.823	108.2	0.49
1911.706	111.0	0.54

Easily resolved for every measure. Many recent observations.

1104 H 1106

R.A. $2^h\ 2^m\ 5^s$ Decl. + 62° 57′

1910.744	72°3	9″79
10.777	72.3	9.54
10.788	72.7	9.75
1910.770	72.4	9.69

This is not in BD. It is 68s *p* and 389″ *n* of BD + 62° (362).

1111 Es 48

R.A. $2^h\ 2^m\ 11^s$ Decl. + 42° 17′

1911.774	193.°3	9.″51
11.834	195.6	9.36
11.851	196.4	9.35
1911.820	195.1	9.41

1907.56	190.°3	9.″94	3n	β

[β (*Carnegie Inst.* 168)]

Distance diminishing, angle increasing. Proper motion.

1147 See 17

R.A. $2^h\ 6^m\ 27^s$ Decl. − 21° 25′

1910.763	356.°8	8.″93
10.807	356.0	8.80
10.821	356.3	8.77
1910.797	356.4	8.83

Measures of distance discordant but there is probably no change.

1154 Hu 424

R.A. $2^h\ 7^m\ 15^s$ Decl. + 23° 8′

1911.834	334.°7	1.″68
11.851	334.0	1.72
11.963	332.1	1.74
1911.883	333.6	1.71

1908.92	340.°5	1.″52	2n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

No change.

1156 H 2118

R.A. $2^h\ 7^m\ 26^s$ Decl. + 72° 50′

1909.845	46.°4	29.″86
09.865	47.3	29.84
09.958	226.4	29.80
1909.889	46.7	29.83

1911.69	46.°8	29.″60	3n	Bies

[Van Biesbroeck (*Ann. Observ. Belgique*, N. S. XIII)]

No early measures.

1161 H 2119. BD 18° (285)

R.A. $2^h\ 8^m\ 18^s$ Decl. + 18° 14′

1910.824	303.°1	28.″73
10.829	303.3	28.71
10.944	302.8	28.67
1910.866	303.1	28.70

No early measures.

1167 Hd 57

R.A. $2^h\ 9^m\ 9^s$ Decl. + 23° 54′

1911.851	95.°4	7.″75
11.873	95.2	7.73
11.963	94.9	7.73
1911.896	95.2	7.74

No change. Midway between BD 24° (303) and 24° (306).

1185 H 3491

R.A. $2^h\ 10^m\ 34^s$ Decl. − 21° 34′

1910.782	286.°1	6.″99
10.807	286.5	7.05
12.877	288.0	6.71
1911.489	286.9	6.92

Probably fixed.

1186 Tucker

R.A. $2^h\ 10^m\ 35^s$ Decl. + 37° 32′

1909.865	237.°8	2.″76
09.900	237.3	3.00
09.917	236.6	3.18
1909.894	237.2	2.98

Without motion.

1192 H 2122

R.A. $2^h\ 10^m\ 52^s$ Decl. + 71° 38′

1909.845	317.°8	31.″64
09.865	318.3	31.70
09.958	136.8	31.52
1909.889	317.6	31.62

1909.07	318.°5	31.″11	3n	Bies

[Van Biesbroeck (*Ann. Observ. Belgique*, N. S. XIII)]

Late measures reverse the quadrant. No early measures.

1193 OΣ (App) 26

R.A. $2^h\ 11^m\ 2^s$ Decl. + 59° 28′

A and B

1909.824	20.°2	63.″51
09.845	199.9	63.23
09.865	19.7	63.07
09.958	19.5	.....
1909.873	19.8	63.27

Strong color contrast. The southern star is yellow, the northern bluish. Relatively fixed.

A and C (11.2)

1909.824	81°.8	75″.24
09.917	81.5	74.69
09.958	80.8	74.69
1909.900	81.4	74.87

1201 O. Stone 5

R.A. 2^h 12^m 12^s Decl. − 31° 17′

1911.832	201°.2	2″.83
12.823	199.7	2.78
12.839	200.4	2.97
1912.498	200.4	2.86

A star of 9.0 magnitude 3′ distant in 218°.

1905.99	202°.5	2″.60	2n	Ol

[Olivier (*A. N.* 4166)]

No certain change.

1206 H 327. SD − 7° (400)

R.A. 2^h 13^m 10^s Decl. − 7° 24′

1910.835	313°.6	24″.19
10.851	313.8	23.92
10.944	314.6	24.28
1910.877	314.0	24.13

No significant motion.

1212 Σ 248

R.A. 2^h 13^m 31^s Decl. + 42° 14′

1911.722	146°.9	1″.42
11.725	144.3	1.35
11.774	143.4	1.36
1911.740	144.9	1.38

Retrograde motion.

1220 H 3120

R.A. 2^h 14^m 22^s Decl. − 24° 25′

1911.832	108°.3	42″.96
11.834	109.2	42.92
12.823	287.8	42.81
1912.163	108.4	42.90

The magnitudes are equal. No early measures.

1226 β 8

R.A. 2^h 14^m 59^s Decl. + 8° 20′

1910.750	208°.0	1″.13
10.884	202.3	1.19
10.971	207.7	1.13
11.673	26.9	1.23
1911.070	206.2	1.17

Without change as yet.

1227 Σ 252

R.A. 2^h 15^m 20^s Decl. + 66° 18′

1910.744	42°.6	3″.29
10.766	43.0	3.24
10.777	41.9	3.09
1910.762	42.5	3.21

Entirely fixed.

1228 H 3495

R.A. 2^h 15^m 25^s Decl. − 11° 29′

1910.739	300°.4	31″.36
10.750	300.9	31.53
10.763	301.1	31.37
1910.751	300.8	31.42

1908.84	299°.3	31″.84	2n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

No certain change.

1236 H 3132

R.A. 2^h 16^m 42^s Decl. + 72° 14′

A and B

1910.810	153°.9	29″.72
11.634	153.2	29.58
11.755	153.4	29.71
1911.400	153.5	29.67

No early measures.

A and C

1910.810	111°.1	50″.77
11.634	110.5	50.51
11.755	110.9	50.78
1911.400	110.8	50.69

1251 H 2133. BD 72° (134)

R.A. 2^h 18^m 0^s Decl. + 72° 33′

A and B (9.7 … 10.5)

1910.810	150°.4	28″.95
11.755	150.9	28.67
11.826	151.0	28.54
1911.464	150.8	28.72

1909.07	150°.7	28″.54	3n	Bies

No early measures of A and B.

B and C (10.5 … 11.1)

1910.810	135°.0	4″.16(a)
11.755	139.4	4.60(a)
11.826	140.6	4.30(a)
1911.464	138.3	4.35

(a) Seeing very poor.

1909.08	134°.9	3″.90	3n	Bies

[Van Biesbroeck (*Ann. Observ. Belgique*, N. S. XIII)]

1254 Hu 537

R.A. 2^h 18^m 9^s Decl. + 48° 41′

1910.796	15°.6	1″.86
11.725	14.9	1.96
11.755	13.9	2.02
1911.425	14.8	1.95

No change as yet.

1259 Σ 266

R.A. 2^h 18^m 48^s Decl. − 2° 39′

1910.739	267°.5	7″.69
10.742	267.1	7.63
10.750	267.8	7.85
1910.744	267.5	7.72

Fixed.

1262 Σ 262. *ι Cassiopeiae*

R.A. 2^h 19^m 10^s Decl. + 66° 52′

A and B

1910.744	255°.6	2″.55
10.796	252.7	2.43
10.895	251.8	2.42
1910.812	253.4	2.47

Retrograde motion.

A and C

1910.744	111°.5	7″.45
10.796	111.1	7.49
10.895	110.1	7.57
1910.812	110.9	7.50

No change.

1909.74	250°.6	2″.17	2n	Lau
1909.74	111.2	7.47	2n	Lau

[Lau (*A. N.* 4488)]

1273 H 2137

R.A. 2^h 20^m 44^s Decl. + 42° 42′

1911.988	132°.4	27″.01
12.680	133.1	26.73
12.828	133.1	26.86
1912.499	132.9	26.87

No early measures.

…. BD 42° (525) (9.0 … 10.8)

R.A. 2^h 20^m 49^s Decl. + 42° 15′

1911.988	212°.9	15″.06
12.680	214.6	15.25
12.828	213.3	15.05
1912.499	213.6	15.12

Due south of **1273** = H 2137. No prior measures.

1277 β 1172

R.A. 2^h 21^m 27^s Decl. + 56° 42′

A and B

1911.725	240°.5	1″.77
12.680	234.3	1.84
12.839	238.2	1.84
1912.415	237.7	1.82

No change.

A and C

1911.725	18°.1	38″.82
12.680	18.1	38.70
12.828	18.5	38.78
1912.411	18.2	38.77

No prior measures of C.

1278 Σ 269

R.A. $2^h\ 21^m\ 46^s$ Decl. + 29° 23′

1911.758	341°.8	1″.85
11.774	342.1	1.99
11.851	342.3	2.00
1911.794	342.1	1.95

The advance in angle indicated in β G. C. is not substantiated.

1282 A 447

R.A. $2^h\ 22^m\ 40^s$ Decl. − 7° 36′

1911.832	153°.3	3″.31
11.851	150.2	3.15
12.051	157.6	2.89(a)
1911.911	153.7	3.12

(a) Temperature = − 2° F.

No change.

1293 A. G. 40

R.A. $2^h\ 24^m\ 10^s$ Decl. + 20° 58′

1910.944	244°.7	5″.91
10.947	244.5	5.73
10.969	244.4	5.74
1910.953	244.5	5.79

Fixed. In *Ann. Observ. Belgique*, N. S. XIII for **1293** read **1292**.

1305 Howe 6. SD − 8° (470)

R.A. $2^h\ 25^m\ 40^s$ Decl. − 8° 8′

1910.944	202°.6	2″.34
10.969	204.5	2.20
10.971	205.4	2.40
1910.961	204.2	2.31

Without motion.

1306 A. G. 41

R.A. $2^h\ 25^m\ 51^s$ Decl. + 35° 23′

1911.826	83°.7	4″.75
11.977	80.3	4.63
12.051	79.8	4.57
1911.951	81.3	4.65

Unchanged.

1313 A. G. 42

R.A. $2^h\ 26^m\ 48^s$ Decl. + 39° 46′

1911.796	144°.7	6″.43
11.826	142.3	6.44
11.873	142.6	6.49
1911.832	143.3	6.45

I make the distance larger than previous observers.

1314 A 449

R.A. $2^h\ 27^m\ 15^s$ Decl. − 7° 24′

1911.832	347°.3	4″.16
11.851	345.9	4.13
12.051	344.5	4.17
1911.911	345.9	4.15

No change as yet.

1345 Σ 284

R.A. $2^h\ 31^m\ 32^s$ Decl. + 60° 46′

A and B

1911.634	191°.9	6″.08
11.777	194.4	5.98
11.796	195.0	6.11
11.823	192.7	....
1911.757	193.5	6.06

The angle is slowly diminishing, the distance increasing.

A and C

1911.634	8°.2	53″.04
11.777	8.7	53.13
11.796	9.2	53.23
1911.736	8.7	53.13

No earlier measures of C.

1346 Σ 285

R.A. $2^h\ 31^m\ 41^s$ Decl. + 32° 54′

1911.826	167°.8	....
11.873	167.3	2″.09
11.977	173.5	1.99
12.051	172.1	1.91(a)
1911.932	170.2	2.00

(a) Temperature = − 3° F.

Very slow retrograde motion. A considerable number of recent measures.

.... A 2335. BD 11° (366) (9.0 ... 12.5)

R.A. $2^h\ 31^m\ 50^s$ Decl. + 11° 15′

1908.698	321°1	2″02	40
08.793	321.4	2.10	40
1908.746	321.3	2.06	

These measures antedate Aitken's discovery. Found with the 40-inch while searching for **1316** = Hn 63.

1911.20	322°2	1″65	2n	A

[Aitken (*Bull. L. O.* 204)]

1348 H 2153

R.A. $2^h\ 32^m\ 8^s$ Decl. + 16° 57′

1911.873	351°0	20″67
12.708	350.7	20.79
12.828	350.7	20.79
1912.470	350.8	20.75

1909.95	351°7	21″10	2n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

No change is probable.

1351 A 451

R.A. $2^h\ 32^m\ 21^s$ Decl. − 6° 30′

1911.774	152°5	1″59
11.832	152.8	1.71
11.837	154.1	1.78
1911.814	153.1	1.69

No significant change.

1353 Σ 287

R.A. $2^h\ 32^m\ 25^s$ Decl. + 14° 20′

1912.823	73°2	6″83
15.648	73.9	6.86
1914.235	73.5	6.84

No appreciable change.

12904 Hu 1043

R.A. $2^h\ 32^m\ 29^s$ Decl. + 14° 55′

1912.880	59°8	3″06
12.883	239.1	2.97
12.976	58.8	2.94
1912.913	59.2	2.99

No change as yet.

12905 Hu 1044

R.A. $2^h\ 32^m\ 32^s$ Decl. + 13° 59′

1912.814	128°6	1″83
12.828	132.2	1.78
12.839	131.4	1.75
1912.827	130.7	1.79

C (9.5) in 56° : 75″.
No change.

1354 β 1315

R.A. $2^h\ 32^m\ 32^s$ Decl. + 13° 59′

A and B

1911.774	132°2	1″75
11.832	132.0	1.77
11.837	133.6	1.88
1911.814	132.6	1.80

A and C

1911.774	56°6	77″70
11.832	57.5	77.88
11.837	57.4	77.76
1911.814	57.2	77.78

There is apparently no change.

1357 Ho 315

R.A. $2^h\ 32^m\ 52^s$ Decl. − 2° 6′

1910.884	352°3	1″69
10.911	354.9	1.54
10.971	355.6	1.54
1910.922	354.3	1.59

No certain motion. See Doolittle (*Pub. Flower Obsy.* III) and Olivier, Wilson (*A. N.* 4227).

1365 OΣ 43

R.A. $2^h\ 33^m\ 42^s$ Decl. + 26° 6′

1911.774	41°9	1″13
11.777	37.3	1.15
11.977	35.2	1.16
12.051	37.6	1.22
1911.895	38.0	1.17

It now seems that the retrograde motion is orbital.

1380 A. G. 48

R.A. $2^h\ 34^m\ 44^s$ Decl. + 10° 52′

1912.880	213°.9	3″.52
12.883	215.0	3.61
12.976	213.0	3.44
1912.913	214.0	3.52

Fixed.

1382 A. G. 49

R.A. $2^h\ 34^m\ 51^s$ Decl. + 38° 6′

1912.880	340°.0	14″.96
12.883	340.4	14.96
12.973	341.4	14.69
1912.912	340.6	14.87

1910.17	341°.3	14″.89	1n	Do

[Doberck (*A. N.* 4479)]

Fixed unless perhaps the angle is decreasing.

.... Es 231. BD 37° (606)

R.A. $2^h\ 35^m\ 20^s$ Decl. + 37° 55′

1912.880	81°.8	4″.70
12.883	82.2	4.99
1912.881	82.0	4.84

1905.83	81°.1	3″.95	2n	Es

[Espin (*M. N.* LXVI, 145)]

sf **1382** = A. G. 49.

1389 Σ 293

R.A. $2^h\ 35^m\ 31^s$ Decl. + 56° 33′

A and B

1912.757	83°.4	9″.62
12.793	83.7	9.38
12.828	85.1	9.26
1912.793	84.1	9.42

Both angle and distance are increasing.

A and C (12.5)

1912.757	335°.0	79″.44
12.828	335.1	79.30
1912.792	335.0	79.37

β first measures C as follows:

1909.82	335°.0	79″.59	3n	β

[β (*Carnegie Inst.* 168)]

1391 Hu 540

R.A. $2^h\ 35^m\ 37^s$ Decl. + 51° 27′

1912.793	214°.7	3″.93
12.839	215.5	3.95
1912.816	215.1	3.94

A star (13.2) in 97° : 16″. Probably unchanged.

1406 Es 9 (7.5 ... 12.0)

R.A. $2^h\ 37^m\ 55^s$ Decl. + 52° 39′

1909.044	28°.4	2″.77	40
09.112	29.6	....	12
09.140	25.4	3.04	12
09.162	25.8	2.79	12
1909.114	27.3	2.87	

Motion questionable.

12924 Hu 1053

R.A. $2^h\ 57^m\ 55^s$ Decl. + 63° 21′

1912.691	58°.2	2″.17
12.757	60.4	2.34
12.793	60.5	2.24
1912.747	59.7	2.25

No certain evidence of motion.

1568 OΣ 50

R.A. $3^h\ 0^m\ 45^s$ Decl. + 71° 6′

1909.845	195°.4	1″.37
09.967	197.2	1.56
09.994	196.1	1.42
1909.935	196.2	1.47

1908.80	199°.2	1″.61	2n	Do

[Doberck (*A. N.* 4327)]

The motion which has been apparently rectilinear now seems to be arrested, indicating orbital motion.

1570 Σ 349. BD 63° (398)

R.A. $3^h\ 0^m\ 45^s$ Decl. + 63° 20′

1912.691	321°.5	6″.31
15.662	320.5	6.19
1914.177	321.0	6.25

Fixed.

1571 Σ 353 *rej.*

R.A. $3^h\ 0^m\ 47^s$ Decl. + 17° 25′

1910.944	55°.4	11″.53
11.090	56.0	10.74
11.717	56.8	10.94
11.774	56.8	10.92
1911.381	56.2	11.03

A faint star (12.5) in 15° : 25″. More observations are needed.

1584 β 1030

R.A. $3^h\ 3^m\ 12^s$ Decl. + 21° 17′

1910.722	327°.8	0″.42
10.884	152.2	0.52
10.911	150.9	0.50
10.971	327.9	0.48
1910.872	149.7	0.48

Slow retrograde motion.

1586 H 1132

R.A. $3^h\ 3^m\ 48^s$ Decl. + 66° 33′

1909.845	20°.9	7″.39
09.865	20.4	7.51
09.900	22.4	7.35
1909.870	21.2	7.42

There are recent measures since 1907 but none earlier.

1587 H 2174

R.A. $3^h\ 3^m\ 51^s$ Decl. − 9° 3′

1910.782	198°.8	18″.46
10.829	199.0	18.19
10.835	199.4	18.30
1910.815	199.1	18.32

Only Doolittle's measures of 1908. (*Pub. Flower Obsy.* IV).

1588 Glasenapp 1

R.A. $3^h\ 4^m\ 8^s$ Decl. + 14° 40′

1910.006	84°.9	4″.60
10.115	88.1	4.30
10.195	84.8	4.26
1910.105	85.9	4.39

Measures of distance very discordant, but probably no motion.

1589 H 3551

R.A. $3^h\ 4^m\ 15^s$ Decl. − 14° 26′

I failed to find this star. It may be identical with **1632**.

1593 Hu 605 (9.4 ... 10.8)

R.A. $3^h\ 4^m\ 31^s$ Decl. − 14° 19′

1910.739	62°.1	2″.52
10.750	62.6	2.43
11.046	62.7	2.43
11.837	63.7	2.61
1911.093	62.8	2.50

No change in the ten years since discovery.

1614 OΣ 52

R.A. $3^h\ 7^m\ 2^s$ Decl. + 65° 13′

1911.777	113°.1	0″.44
12.116	107.4	0.42
12.730	109.8	0.42
1912.208	110.1	0.43

Marked retrograde motion. The measures of distance are very erratic. The character of the motion is quite indeterminate. β adds a distant star. (*Carnegie Inst.* 168).

1623 Σ 367

R.A. $3^h\ 7^m\ 52^s$ Decl. + 0° 18′

1910.722	19°.6	0″.56
10.884	15.7	0.50
10.971	196.2	0.50
1910.859	17.2	0.52

The angle requires a correction of 180°. The magnitudes are equal.

1908.94	202°.3	0″.75	3n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

The retrograde motion is certainly orbital. On the basis of rectilinear motion my measure of distance should have been about 1″.0. An interesting star. More measures are needed.

1632 H 3558

R.A. $3^h\ 9^m\ 19^s$ Decl. − 14° 28′

1910.739	137°.0	15″.89
10.750	137.2	16.01
10.763	137.6	16.06
1910.751	137.3	15.99

The star β G. C. **1589**, H 3551, could not be found. It is probably identical with this.

1636 H 2181

R.A. $3^{h}\ 9^{m}\ 31^{s}$ Decl. + 18° 44′

1910.782	89°.4	25″.58
10.898	89.7	25.41
10.944	89.0	25.61
1910.875	89.4	25.53

1910.03 89°.7 26″.24 2n Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

These two recent measures are quite discordant.

1638 Hu 545

R.A. $3^{h}\ 9^{m}\ 43^{s}$ Decl. + 48° 49′

1910.744	80°.4	3″.52
10.766	76.6	3.71
10.777	76.4	3.77
10.788	77.7	....
1910.769	77.8	3.67

Probably unchanged.

1645 H 2179

R.A. $3^{h}\ 11^{m}\ 2^{s}$ Decl. + 74° 53′

1909.845	342°.7	26″.02
09.900	341.7	.....
09.958	342.7	26.10
1909.901	342.4	26.06

1908.29 343°.1 25″.87 3n Bies

[Van Biesbroeck (*Ann. Observ. Belgique*, N. S. XIII)]

No early measures.

1651 Hu 19

R.A. $3^{h}\ 12^{m}\ 14^{s}$ Decl. − 11° 0′

1910.750	302°.3	3″.25
10.807	299.5	3.06
10.835	299.1	3.32
1910.797	300.3	3.21

Without change.

1655 β 1294

R.A. $3^{h}\ 12^{m}\ 24^{s}$ Decl. + 46° 15′

1910.744	229°.4	6″.49
10.766	226.2	6.68
10.777	226.0	6.60
10.788	227.2	....
1910.769	227.2	6.59

The distance is larger than in the earlier measures, but change is uncertain.

1669 Es 52

R.A. $3^{h}\ 13^{m}\ 48^{s}$ Decl. + 60° 19′

1910.744	286°.1	5″.70
10.810	285.8	6.14
11.947	282.8	6.20
1911.167	284.9	6.01

No motion.

12933 Hu 1057

R.A. $3^{h}\ 15^{m}\ 4^{s}$ Decl. + 76° 53′

A and B

1912.839	103°.9	3″.03
12.875	104.9	3.03
12.916	105.4	3.07
1912.877	104.7	3.04

No change as yet.

A and C

1912.839	277°.4	62″.79
12.875	277.2	62.77
12.916	277.3	62.85
1912.877	277.3	62.80

No prior measures.

1678 Σ 380

R.A. $3^{h}\ 15^{m}\ 17^{s}$ Decl. + 8° 20′

1910.722	60°.5	1″.17
10.739	60.2	1.17
10.742	61.5	1.16
1910.734	60.7	1.17

1907.72 62°.3 1″.23 1n Lau

[Lau (*A. N.* 4221)]

The character of the retrograde motion is not yet certain.

1680 Es 53. BD 59° (650)

R.A. $3^{h}\ 15^{m}\ 42^{s}$ Decl. + 59° 7′

1912.727	333°.2	3″.71
12.730	329.9	3.67
12.757	331.5	3.77
1912.738	331.5	3.72

No early measures.

1684 H 3569

R.A. $3^h\ 16^m\ 27^s$ Decl. − 13° 42′

1910.722	210°.7	20″.83
10.742	208.7	21.13
10.750	209.7	20.73
1910.738	209.7	20.90

No early measures.

1694 H 2188

R.A. $3^h\ 17^m\ 36^s$ Decl. − 10° 40′

1910.750	46°.2	24″.08
10.763	46.3	24.28
10.769	46.7	24.23
1910.761	46.4	24.20

No early measures.

1698 Σ 384

R.A. $3^h\ 18^m\ 46^s$ Decl. + 59° 29′

1912.727	270°.8	2″.21
12.730	268.7	2.00(a)
12.757	272.6	2.29
1912.738	270.7	2.17

(a) Broad daylight, measured with dark wires.

No material change.

1703 Σ 385

R.A. $3^h\ 19^m\ 20^s$ Decl. + 59° 31′

1912.727	160°.0	2″.48
12.730	162.3	2.48
12.757	161.8	3.00
12.801	161.7	2.75
1912.754	161.4	2.68

Fixed.

1704 Holmes

R.A. $3^h\ 20^m\ 2^s$ Decl. + 59° 30′

1912.727	48°.8	5″.37
12.730	51.4	5.34
12.757	50.0	5.46
1912.738	50.1	5.39

A star (12.0) in 54° : 30″.

No change. The measures of distance are very discordant for such an easy pair.

1706 Hu 21

R.A. $3^h\ 20^m\ 11^s$ Decl. − 13° 29′

1910.722	37°.9	1″.38
11.046	39.6	1.28
11.059	36.2	1.41
1910.942	37.9	1.36

1907.69 39°.1 1″.19 3n Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

The measures of distance are not harmonious, but there is apparently no change.

1708 Σ 389

R.A. $3^h\ 20^m\ 31^s$ Decl. + 58° 57′

1912.691	62°.7	3″.04
12.727	63.7	3.06
12.730	65.4	2.78
12.757	65.4	2.89
1912.726	64.3	2.94

A faint star (12.5) in 201° : 45″. Entirely fixed.

1710 OΣ 54

R.A. $3^h\ 20^m\ 50^s$ Decl. + 67° 10′

1910.769	356°.4	24″.74
10.777	355.9	24.59
10.810	356.5	24.63
1910.785	356.3	24.65

Slow change shown in the decreasing distance.

1717 Es —

R.A. $3^h\ 21^m\ 10^s$ Decl. + 49° 36′

1910.788	297°.0	19″.83
10.796	297.4	19.56
10.895	297.2	19.56
1910.826	297.2	19.65

No change since the first measures of 1900.

1729 OΣ 56 *rej.*

R.A. $3^h\ 23^m\ 6^s$ Decl. + 47° 27′

1910.788	352°.9	26″.15
10.895	352.2	25.91
11.634	351.9	26.10
1911.106	352.3	26.05

Increase in distance from proper motion.

1750 A. G. 68

R.A. $3^h\ 25^m\ 37^s$ Decl. + 11° 8′

1910.763	248.°3	17.″21
10.769	248.0	16.99
10.782	247.4	17.30
1910.771	247.9	17.17

Decided decrease in distance.

.... Es 622. BD 53° (680)

R.A. $3^h\ 26^m\ 30^s$ Decl. + 53° 31′

1912.951	31.°0	4.″97
12.954	31.1	5.08
1912.952	31.0	5.02

1908.91 34.°1 4.″62 3n Es

[Espin (*M. N.* LXIX, 223)]

np **12949** = A 985.

1758 A. G. 69

R.A. $3^h\ 26^m\ 57^s$ Decl. + 3° 44′

1910.769	351.°3	6.″96
10.807	351.1	6.96
10.829	351.0	6.96
1910.802	351.1	6.96

1909.87 353.°4 6.″20 2n Doo

Doolittle (*Pub. Flower Obsy.* IV)]

The measures are not in good accord. There is probably increase in distance.

1759 β 788

R.A. $3^h\ 27^m\ 9^s$ Decl. + 42° 11′

A and B

1912.680	302.°6	2.″75
12.839	301.8	2.75
12.861	304.4	2.76
1912.793	302.9	2.75

A and C

1912.680	82.°4	34.″22
12.839	82.4	34.22
12.861	82.2	34.07
1912.793	82.3	34.17

The system is without change.

1766 Σ 414 (8.3 ... 8.3)

R.A. $3^h\ 27^m\ 33^s$ Decl. + 19° 24′

1911.087	183.°2	7.″57
11.810	183.9	7.54
11.963	184.2	7.60
1911.620	183.8	7.57

No certain change since 1829.

1771 Σ 416 *rej.* (9.0 ... 10.3)

R.A. $3^h\ 28^m\ 2^s$ Decl. + 19° 24′

1910.944	57.°2	27.″35
10.969	57.5	27.20
11.810	57.9	27.13
11.963	58.0	26.98
1911.422	57.7	27.17

Both angle and distance are increasing.

A and C (11.5)

1910.969	290.°1	22.″07
11.810	291.4	22.44
11.963	291.8	22.42
1911.581	291.1	22.31

First noted by Espin. Measured by β in 1910.

1773 Hu 102

R.A. $3^h\ 28^m\ 8^s$ Decl. + 48° 16′

1911.755	59.°6	3.″25
11.793	58.8	3.01
11.823	59.1	3.01
1911.790	59.2	3.09

No change since 1900.

1774 β 533

R.A. $3^h\ 28^m\ 9^s$ Decl. + 31° 17′

1911.774	228.°4	0.″74
11.821	232.3	0.70
11.949	223.7	0.69
12.051	223.2	0.73(a)
1911.899	226.9	0.72

(a) Seeing very good. Temperature = − 3° F.

The angle requires a correction of 180°. Retrograde motion with perhaps increasing distance.

1775 Es 54

R.A. $3^h\ 28^m\ 38^s$ Decl. $+48°\ 41'$

1911.755	248°.5	4″.63
11.793	248.2	4.69
11.823	247.5	4.54
1911.790	248.1	4.62

No certain evidence of change.

1782 H 2195. BD 5° (518) (9.4 ... 10.6)

R.A. $3^h\ 30^m\ 7^s$ Decl. $+5°\ 51'$

1910.895	360°.4	23″.49
10.969	359.5	22.85
11.046	359.2	22.78
1910.970	359.7	23.04

No early measures. The present correct identifications of this and H 2196 indicate that H 2196 is the preceding star.

1784 H 2196. BD 5° (516) (9.5 ... 10.8)

R.A. $3^h\ 29^m\ 51^s$ Decl. $+5°\ 50'$

1910.895	79°.7	29″.92
10.969	80.0	29.35
11.046	79.8	29.46
1910.970	79.8	29.58

No early measures.

1787 Σ 422

R.A. $3^h\ 30^m\ 38^s$ Decl. $+0°\ 12'$

1910.895	249°.4	6″.46
10.898	249.5	6.53
10.944	248.1	6.51
1910.912	249.0	6.50

There are many recent observations of this pair.

1789 Σ 418

R.A. $3^h\ 30^m\ 52^s$ Decl. $+75°\ 0'$

A and B

1911.755	63°.4	19″.66
11.793	63.4	19.65
11.823	64.4	19.75
1911.790	63.7	19.69

Both angle and distance are increasing.

B and C

1911.755	44°.7	33″.17
11.793	45.2	.....
11.823	45.5	33.12
1911.790	45.1	33.14

There are no earlier measures of C.

12947 Hu 1063

R.A. $3^h\ 32^m\ 17^s$ Decl. $+62°\ 33'$

A and B

1912.691	335°.7	2″.95
12.727	332.7	2.95
12.793	336.8	2.88
1912.737	335.1	2.93

No change.

A and C (10.5)

1912.691	122°.2	49″.70
12.727	122.3	49.68
12.793	122.6	49.76
1912.737	122.4	49.71

These are the first measures of C.

1799 Σ 425

R.A. $3^h\ 32^m\ 32^s$ Decl. $+33°\ 44'$

1910.895	86°.7	2″.70
11.049	269.5	2.64
11.087	269.1	2.73
11.717	86.1	2.60
11.725	266.8	2.64
1911.295	267.6	2.66

Retrograde motion. The magnitudes are equal and the quadrant uncertain.

12949 A 985

R.A. $3^h\ 32^m\ 47^s$ Decl. $+52°\ 54'$

1912.940	42°.7	4″.10
12.951	41.7	4.08
12.954	41.9	3.98
1912.948	42.1	4.05

Without motion.

1804 H 2198. BD 54° (705)

R.A. 3^{h} 32^{m} 59^{s} Decl. + 54° 12′

1911.903	307°.4	41″.73
11.966	307.3	41.55
12.680	307.7	41.60
1912.183	307.5	41.63

No early measures. B is BD 54° (704).

1818 Σ 431. 40 *Persei*

R.A. 3^{h} 34^{m} 46^{s} Decl. + 33° 35′

1911.717	238°.1	20″.18
11.725	238.0	20.14
12.828	237.4	19.87
1912.090	237.8	20.06

Entirely fixed.

1819 A. G. 71

R.A. 3^{h} 34^{m} 47^{s} Decl. + 65° 43′

1912.691	240°.9	7″.94
12.727	241.1	7.92
12.801	241.8	7.97
1912.740	241.3	7.94

No change.

1821 Σ 436

R.A. 3^{h} 35^{m} 11^{s} Decl. − 13° 0′

1912.814	235°.6	37″.72
12.880	236.2	37.80
12.891	236.0	38.09
1912.862	235.9	37.87

Well-known case of proper motion.

1822 H 2201

R.A. 3^{h} 35^{m} 13^{s} Decl. − 5° 41′

1912.814	36°.9	40″.84
12.880	37.2	40.88
12.883	37.2	40.91
1912.859	37.1	40.88

No early measures.

1838 Barnard 3

R.A. 3^{h} 37^{m} 8^{s} Decl. + 23° 43′

1912.680	144°.1	1″.77
12.856	151.0	1.62
12.877	143.8	1.65
13.036	145.1	1.90
1912.862	146.0	1.73

No evidence of motion.

1853 Σ 444

R.A. 3^{h} 38^{m} 43^{s} Decl. + 22° 46′

1912.680	333°.7	3″.62
12.856	335.4	3.62
12.877	333.4	3.74
1912.804	334.2	3.66

The measures of distance are very discordant, but there is no evidence of change.

1854 Σ 443 = S. 435

R.A. 3^{h} 38^{m} 47^{s} Decl. + 41° 7′

A and B

1911.966	47°.1	8″.58
11.977	47.5	8.58
12.097	47.6	8.43
1912.013	47.4	8.53

Little if any relative change.

A and C

1911.966	172°.6	20″.39
11.977	173.2	20.49
12.097	173.5	20.48
1912.013	173.1	20.45

C has a very faint companion in 135° : 3″.5.

1879.40	339°.3	64″.23	2n	Ball
1897.64	343.3	39.94	5n	Doo
1906.65	347.9	27.51	4n	β
1911.71	352.4	20.66	3n	β

[Ball, Doolittle, β (β G.C.) . . . β (*Carnegie Inst.* 168)].

Considering C as fixed, these values with mine give for the proper motion of A:

1″.372 in 153°.1.

1857 Hu 208

R.A. 3^{h} 39^{m} 9^{s} Decl. − 10° 44′

1912.680	152°.8	2″.72
12.814	153.2	2.72
12.946	151.1	2.48
1912.813	152.4	2.64

There may be retrograde motion.

12965 Hu 1070

R.A. 3^{h} 48^{m} 28^{s} Decl. + 78° 39′

1912.691	136°.7	3″.83
12.757	135.4	3.95
12.839	134.5	3.84
12.992	138.6	3.78
1912.820	136.3	3.85

No change.

2034 Σ 493

R.A. $4^h\ 0^m\ 22^s$ Decl. + 5° 22′

1910.722	92°.6	1″.59
10.739	93.0	1.81
10.750	94.1	1.77
1910.737	93.2	1.72

The retrograde motion suggested by β and Doolittle is not substantiated by these measures.

2036 H 1141. BD 68° (308)

R.A. $4^h\ 0^m\ 4^s$ Decl. + 68° 49′

1909.845	343°.4	13″.76
09.958	163.6	14.01
09.967	344.8	13.74
1909.923	343.9	13.84

Star of 13.3 magnitude 20″ preceding.

Schroeter (*A. N.* 4259) identifies the two stars as BD 68° (308), and Greenwich Astrographic 68° (1693–4).

2041 Σ 3114

R.A. $4^h\ 1^m\ 3^s$ Decl. + 39° 51′

1909.865	168°.8	2″.67
09.867	168.6	2.40
09.898	167.4	2.63
1909.877	168.3	2.57

Retrograde motion with increase in distance. Doolittle's note in *Pub. Flower Obsy.* IV indicating *decrease* in distance is evidently a clerical error.

2045 β 1232

R.A. $4^h\ 1^m\ 26^s$ Decl. + 28° 52′

1910.722	4°.3	0″.33
12.886	188.3	0.43
1911.804	6.3	0.38

The few measures of this difficult star are quite discordant. My observations indicate direct motion.

2047 A 467

R.A. $4^h\ 1^m\ 34^s$ Decl. − 6° 48′

1911.810	225°.7	3″.31
13.033	225.6	3.15
13.036	223.9	3.19
1912.626	225.1	3.22

Probably unchanged.

2056 Hu 301

R.A. $4^h\ 2^m\ 32^s$ Decl. + 10° 27′

1911.774	296°.1	0″.82
12.051	294.6	0.82
1911.912	295.3	0.82

No certain motion as yet.

2059 β 546

R.A. $4^h\ 3^m\ 12^s$ Decl. + 41° 33′

1911.725	29°.5	0″.78
11.774	31.6	0.85
11.777	30.7	0.86
1911.759	30.6	0.83

Increase in angle is still questionable.

2060 Σ 498

R.A. $4^h\ 3^m\ 22^s$ Decl. + 53° 28′

1909.845	165°.0	1″.19
09.898	164.0	1.34
09.909	167.6	1.13
1909.884	165.5	1.22

These distances are less than those of other recent observers. The star should be kept under observation.

2061 Σ 500

R.A. $4^h\ 3^m\ 26^s$ Decl. + 39° 57′

1909.845	80°.4	4″.05
09.867	76.6	4.11
09.898	77.3	4.14
09.967	....	3.92
09.991	77.0	....
1909.914	77.8	4.05

The decrease in distance noted by Doolittle is not verified.

2065 A 470

R.A. $4^h\ 4^m\ 31^s$ Decl. − 9° 7′

1911.059	17°.1	0″.82

As yet without motion.

2072 H 2224 (7.5 … 9.2)

R.A. $4^h\ 6^m\ 5^s$ Decl. $-9°\ 9'$

1910.782	310°.7	51″.42
10.835	311.4	51.76
11.059	311.5	51.63
1910.892	311.2	51.60

No early measures.

2085 H 3626

R.A. $4^h\ 7^m\ 34^s$ Decl. $-9°\ 4'$

1910.782	38°.0	20″.55
10.835	37.9	20.49
11.059	37.1	20.39
1910.892	37.7	20.48

No early measures.

2090 Howe 10

R.A. $4^h\ 8^m\ 9^s$ Decl. $-28°\ 51'$

1911.832	39°.5	2″.58
12.051	38.1	2.46
12.062	38.3	2.48
1911.982	38.6	2.51

The angle is larger than in the original observation. Olivier (*A. N.* 4166) and Doberck (*A. N.* 4130) retain the original Howe number.

2091 Kr 22

R.A. $4^h\ 8^m\ 13^s$ Decl. $+60°\ 32'$

1910.766	184°.6	3″.59
10.769	182.1	3.61
10.777	181.3	3.78
10.788	183.0	....
1910.775	182.7	3.66

Without motion.

2105 H 3629. SD $-16°$ (815)

R.A. $4^h\ 8^m\ 47^s$ Decl. $-16°\ 51'$

1910.898	276°.1	16″.69
11.016	277.0	16.52
11.090	276.3	16.49
1911.001	276.5	16.57

There may be motion in this pair.

2115 Σ 520

R.A. $4^h\ 11^m\ 6^s$ Decl. $+22°\ 31'$

1910.933	295°.9	0″.83
10.971	294.8	0.77
11.106	296.6	0.76
1911.003	295.8	0.79

To conform with other observations the angle requires a correction of 180°. Direct motion.

2122 H 3633. SD $-17°$ (838)

R.A. $4^h\ 11^m\ 59^s$ Decl. $-17°\ 6'$

1910.898	10°.8	31″.39
11.016	191.0	31.34
11.095	10.5	31.16
1911.003	10.8	31.30

No early measures.

2132 H 1142. BD 68° (321)

R.A. $4^h\ 12^m\ 9^s$ Decl. $+68°\ 55'$

1910.777	80°.7	25″.47
10.788	81.1	25.47
10.810	81.3	25.52
1910.792	81.0	25.49

Schroeter (*A. N.* 4259) identifies the two stars as BD 68° (321) and Greenwich Astrographic 68° (1728–9).

2134 OΣ 79. 55 *Tauri*

R.A. $4^h\ 13^m\ 3^s$ Decl. $+16°\ 41'$

1911.821	319°.±	0″.25± (a)
11.949	316.1	0.33 (b)
1911.885	317.5	0.29

(a) Estimated distance. (b) Very difficult.

1908.49	307°.3	0″.34	7n	Bies
1908.71	308.0	0.27	1n	β
1908.96	294.5	0.37	3n	Doo

[Van Biesbroeck (*Ann. Observ. Belgique*, N. S. XIII) . . . β (*Carnegie Inst.* 168) . . . Doolittle (*Pub. Flower Obsy.* IV)]

These recent observations show that it is a binary of short period.

2135 Σ 527. SD $-7°$ (792)

R.A. $4^h\ 13^m\ 13^s$ Decl. $-7°\ 43'$

1910.898 191°.3 6″.29

The distance is slowly increasing with no change in angle.

2136 Σ 522 (9.2 ... 9.3)

R.A. $4^{h}\ 13^{m}\ 18^{s}$ Decl. $+ 51^\circ\ 19'$

1911.925	35°.7	1″.59
11.977	35.2	1.55
12.839	214.4	1.59
1912.247	35.1	1.58

Fixed.

2148 A 472

R.A. $4^{h}\ 15^{m}\ 18^{s}$ Decl. $- 9^\circ\ 8'$

1911.717	255°.1	3″.22
11.823	258.4	3.31
11.832	255.4	3.31
1911.791	256.3	3.28

Without motion as yet.

2149 β 87

R.A. $4^{h}\ 15^{m}\ 18^{s}$ Decl. $+ 20^\circ\ 32'$

1910.769	166°.0	2″.32
10.884	164.4	2.17
10.911	166.0	2.48
1910.855	165.5	2.32

1910.15	169°.3	1″.84	2n	Do

[Doberck (*A. N.* 4479)]

The evidence for change is inconclusive.

2154 OΣ 82

R.A. $4^{h}\ 15^{m}\ 56^{s}$ Decl. $+ 14^\circ\ 46'$

1911.949	90°.0	0″.60
12.886	86.6	0.85
1912.417	88.3	0.72

Well-known binary.

2157 Σ 536

R.A. $4^{h}\ 16^{m}\ 13^{s}$ Decl. $- 4^\circ\ 58'$

1910.769	163°.6	1″.91
10.884	162.0	1.81
10.911	162.4	1.94
1910.855	162.7	1.89

Probably slow direct motion.

2158 Σ 537

R.A. $4^{h}\ 16^{m}\ 21^{s}$ Decl. $- 10^\circ\ 14'$

1911.823	342°.6	16″.68
11.837	342.6	16.55
11.873	342.1	16.47
1911.844	342.4	16.57

Slow rectilinear motion.

2161 Σ 535. *Tauri* 230

R.A. $4^{h}\ 16^{m}\ 39^{s}$ Decl. $+ 11^\circ\ 6'$

1910.769	323°.5	1″.63
10.859	324.2	1.88
10.884	322.1	1.71
1910.837	323.2	1.74

The character of the retrograde motion is still uncertain.

2164 Ho 15 = Ku 17 (9.2 ... 9.4)

R.A. $4^{h}\ 16^{m}\ 55^{s}$ Decl. $+ 29^\circ\ 51'$

1912.108	330°.0	0″.79
12.116	328.5	0.77
12.187	329.2	0.74
1912.137	329.2	0.77

1888.97	152°.2	0″.68	2n	Sch
1890.71	150.2	0.83	3n	Sch
1899.12	146.1	0.84	2n	Aitken
1905.17	147.4	0.72	2n	Bowyer
1906.04	323.4	0.79	2n	Bowyer
1907.49	150.8	0.76	2n	Bowyer

[Schiaparelli (*Pub. Osserv. di Brera* XLVI) . . . Aitken (*Pub. L. O.* XII) . . . Bowyer (*Greenwich Obsns.* 1905; 1906; 1907)]

Apparently no change.

2169 Σ 531

R.A. $4^{h}\ 17^{m}\ 5^{s}$ Decl. $+ 55^\circ\ 22'$

1911.725	307°.4	1″.10
11.774	303.0	1.05
11.777	302.8	1.30
1911.759	304.4	1.15

Probably slow direct motion.

2171 Hu 549

R.A. $4^{h}\ 17^{m}\ 17^{s}$ Decl. $+ 51^\circ\ 3'$

1911.725	164°.1	1″.66
11.777	171.1	1.66
11.925	168.4	1.65
1911.809	167.9	1.66

No change since 1902.

2176 H 2229 (9.2 . . . 10.8)

R.A. $4^h\ 17^m\ 39^s$ Decl. − 5° 51′

1911.823	244°.1	5″.94
11.837	243.9	5.65
11.873	243.1	5.97
1911.844	243.7	5.85

Probably unchanged.

2188 Σ 544

R.A. $4^h\ 18^m\ 57^s$ Decl. − 9° 13′

A and B

1912.004	348°.7	2″.94
12.010	351.2	2.83
12.023	350.7	2.91
1912.312	350.2	2.89

Retrograde motion with increasing distance.

A and C (8.3)

1912.004	83°.1	135″.99
12.023	82.9	135.86
1912.013	83.0	135.92

No prior measures of C.

2190 H 2230

R.A. $4^h\ 19^m\ 9^s$ Decl. + 2° 5′

1912.004	322°.9	34″.49
12.010	323.4	34.68
12.023	323.1	34.58
1912.012	323.1	34.58

Apparently unchanged.

2223 H 3649. SD − 14° (909)

R.A. $4^h\ 23^m\ 25^s$ Decl. − 14° 9′

1912.040	174°.2	21″.67(a)
12.828	173.6	21.38
12.880	173.4	21.25
1912.583	173.7	21.43

(a) Seeing vile. Temperature = − 3° F.
Probably unchanged.

2270 OΣ 86

R.A. $4^h\ 29^m\ 33^s$ Decl. + 19° 13′

1912.680	54°.4	0″.50
12.886	54.3	0.49
1912.783	54.3	0.49

1905.59	238°.7	0″.62	4n	Doo
1906.00	50.7	0.52	1n	Lau
1909.47	52.1	0.51	2n	Do

[Doolittle (*Pub. Flower Obsy.* IV) . . . Lau (*A.N.* 4111) . . . Doberck (*A. N.* 4394)]

Retrograde motion.

2272 Σ 567

R.A. $4^h\ 29^m\ 40^s$ Decl. + 19° 15′

1912.680	320°.5	2″.14
12.814	323.1	2.26
12.886	322.7	2.12
1912.793	322.1	2.17

Direct motion, apparently as well satisfied on the grounds of rectilinear, as by possible orbital motion.

2275 Hu 305

R.A. $4^h\ 29^m\ 50^s$ Decl. + 20° 48′

1912.004	279°.4	2″.14
12.680	276.3	2.29
12.814	275.6	2.18
12.872	275.9	2.11
1912.592	276.8	2.18

C (11.2) in 80° : 53″.
No change in the short interval since discovery.

2284 Σ 572. *Aurigae* 4

R.A. $4^h\ 31^m\ 4^s$ Decl. + 26° 42′

1912.680	199°.1	3″.84
12.886	198.9	3.75
12.946	18.0	4.04
1912.837	198.7	3.88

The distance is increasing and the angle decreasing.

2349 H 349 = Ku 19

R.A. $4^h\ 40^m\ 7^s$ Decl. $+\ 34°\ 34'$

1912.064	87°.1	10″.37
12.108	84.9	10.36
12.116	84.3	10.45
1912.096	85.4	10.39

1904.98	85°.6	9″.87	2n	Espin

[Espin (*M. N.* LXVII, 190)]

Without change.

2466 Δ 6 = β 187 = Ku 20

R.A. $4^h\ 54^m\ 9^s$ Decl. $+\ 14°\ 20'$

1912.064	92°.9	1″.01
12.103	89.6	1.01
12.108	92.9	1.04
1912.092	91.8	1.02

1908.05	92°.5	0″.98	2n	Bowyer
1910.56	90.0	1.16	4n	Doo
1910.95	92.1	1.01	2n	Bowyer
1911.22	95.0	0.93	1n	Furner

[Bowyer (*Greenwich Obsns.* 1908; *M. N.* LXXI, 728) . . . Doolittle (*Pub. Flower Obsy.* IV) . . . Furner (*M. N.* LXXIII, 93)]

No conclusive evidence of motion.

2517 H 357. BD 28° (748)

R.A. $5^h\ 0^m\ 5^s$ Decl. $+\ 28°\ 58'$

1910.739	339°.7	15″.80
11.049	339.6	15.88
11.717	339.6	15.86
1911.168	339.6	15.85

No early measures.

2519 H 692

R.A. $5^h\ 0^m\ 4^s$ Decl. $+\ 35°\ 59'$

1911.988	173°.2	10″.03
12.872	172.8	10.17
12.880	172.4	10.14
1912.580	172.8	10.11

No change.

2522 H 3266

R.A. $5^h\ 0^m\ 6^s$ Decl. $+\ 36°\ 51'$

1912.872	63°.1	8″.65
12.880	63.2	8.73
1912.876	63.1	8.69

Without change.

2523 Hu 446

R.A. $5^h\ 0^m\ 8^s$ Decl. $+\ 22°\ 34'$

1911.717	181°.2	0″.80
11.947	186.1	0.89
12.116	181.3	0.89
1911.927	182.9	0.86

No change as yet.

2529 H 3720

R.A. $5^h\ 0^m\ 45^s$ Decl. $-\ 15°\ 36'$

1910.898	153°.6	29″.04
10.911	154.7	29.37
10.936	154.5	29.06
1910.915	154.3	29.16

1908.96	155°.7	28″.34	2n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

The wide difference in these recent measures suggests change but more observations are needed.

2535 OΣ 98. 14 *Orionis*

R.A. $5^h\ 1^m\ 21^s$ Decl. $+\ 8°\ 20'$

1910.722	152°.9	1″.17
10.750	151.7	1.08
10.933	151.0	0.92
1910.802	151.9	1.06

Well-known binary. There are many recent observations.

2537 H 3723 (9.6 ... 11.5)

R.A. $5^h\ 1^m\ 37^s$ Decl. $-\ 19°\ 56'$

1911.823	65°.4	8″.92
11.916	65.9	8.95
12.023	64.1	8.95
1911.921	65.1	8.94

Probably fixed.

2562 Hu 821

R.A. $5^h\ 4^m\ 37^s$ Decl. $+\ 51°\ 17'$

1911.725	193°.9	1″.22
11.777	202.7	0.97
12.116	203.9	0.97
1911.873	200.2	1.05

No significant change.

2572 Hu 822

R.A. $5^h\ 5^m\ 32^s$ Decl. $+ 51°\ 11'$

1911.725	181°.5	4″.76
11.925	.....	4.70
11.927	184.1	4.69
1911.859	182.8	4.72

Without motion since the recent discovery.

2578 A 51

R.A. $5^h\ 6^m\ 27^s$ Decl. $- 3°\ 11'$

1910.722	277°.3	1″.48
10.750	277.7	1.54
10.769	98.5	1.62
1910.747	277.8	1.55

1908.84	95°.7	1″.29	3n	Doo
1910.24	275.0	1.51	3n	Ol

Doolittle (*Pub. Flower Obsy.* IV) . . . Olivier (*Bull. L. O.* 190)]

No change.

2604 Σ 665

R.A. $5^h\ 8^m\ 38^s$ Decl. $+ 19°\ 36'$

1910.151	255°.2	1″.71(a)
10.739	256.0	1.83
10.750	255.8	1.75
1910.547	255.7	1.76

(a) Temperature = 4° F.
Entirely fixed.

.... Es 574. BD 47° (1122)

R.A. $5^h\ 8^m\ 46^s$ Decl. $+ 47°\ 12'$

1908.971	252°.5	0″.92	12
09.845	253.0	1.07	
09.898	249.9	0.99	
1909.571	251.8	0.99	

A and C

1908.241	242°.0	34″.41	12
08.255	242.8	34.28	12
08.277	243.1	34.34	12
08.264	243.5	34.57	12
1908.264	242.8	34.40	

See measures by β (*A. N.* 4302).

2608 H 3271

R.A. $5^h\ 8^m\ 59^s$ Decl. $+ 37°\ 39'$

1911.966	349°.6	11″.75
11.988	348.3	11.90
12.275	349.7	11.62
1912.076	349.2	11.76

No early measures.

2609 Σ 657

R.A. $5^h\ 9^m\ 11^s$ Decl. $+ 52°\ 43'$

1910.739	285°.7	1″.05
10.744	287.5	1.11
11.062	286.7	1.23
1910.848	286.6	1.13

Slow direct motion.

2614 Hu 823

R.A. $5^h\ 9^m\ 45^s$ Decl. $+ 48°\ 56'$

1910.739	10°.6	4″.35
10.766	11.1	4.50
10.810	7.1	4.32
1910.772	9.6	4.39

Interval too short to show motion.

2622 β 318

R.A. $5^h\ 10^m\ 15^s$ Decl. $- 3°\ 37'$

1911.774	236°.2	0″.68

Possibly the angle has increased slightly.

2629 Hu 35 (9.0 ... 11.0)

R.A. $5^h\ 10^m\ 44^s$ Decl. $- 11°\ 57'$

1911.810	66°.4	2″.82
11.837	68.1	2.72
11.851	67.8	2.91
1911.833	67.4	2.82

Without motion.

2637 Σ 681 (6.3 ... 8.3)

R.A. $5^h\ 11^m\ 42^s$ Decl. $+ 46°\ 50'$

1908.255	180°.5	23″.28	12
08.277	180.1	23.22	12
08.282	180.8	23.06	12
1908.271	180.5	23.19	

Entirely fixed.

2641 Kr 26

R.A. $5^h\ 12^m\ 1^s$ Decl. $+55°\ 48'$

1910.788	71°.0	9″.54
10.810	71.5	9.56
10.985	72.2	9.02
11.062	72.3	9.27
1910.911	71.7	9.35

Unchanged. Faint star (13.0) 14″ *nf* B.

2653 Es 60

R.A. $5^h\ 13^m\ 5^s$ Decl. $+40°\ 43'$

1910.744	267°.6	6″.23
10.777	87.5	6.26
10.788	267.3	6.53
1910.770	267.5	6.34

The distance is somewhat larger than in Espin's original measures, but change is doubtful.

2656 H 696

R.A. $5^h\ 13^m\ 20^s$ Decl. $+27°\ 58'$

1911.963	209°.9	15″.34
11.966	209.5	15.54
11.988	208.9	15.42
1911.972	209.4	15.43

No motion.

2657 Σ 677

R.A. $5^h\ 13^m\ 24^s$ Decl. $+63°\ 16'$

1910.739	241°.8	1″.44
10.744	237.6	1.41
10.777	241.5	1.62
1910.753	240.3	1.49

Rectilinear motion would still satisfy the observations fairly well, but the motion is probably orbital.

2663 Es 61

R.A. $5^h\ 13^m\ 44^s$ Decl. $+40°\ 40'$

1910.744	175°.7	2″.95
10.777	175.5	2.86
10.788	174.0	2.85
1910.770	175.1	2.89

I reverse the angle, otherwise no change.

2667 Es —

R.A. $5^h\ 14^m\ 9^s$ Decl. $+49°\ 27'$

1910.744	175°.1	9″.81
10.777	175.8	9.68
10.788	175.9	9.51
1910.770	175.6	9.67

No motion.

2668 OΣ 104

R.A. $5^h\ 14^m\ 15^s$ Decl. $+46°\ 54'$

1911.755	189°.4	18″.15
11.963	189.6	18.07
11.966	190.9	18.13
1911.895	190.0	18.12

Increasing distance.

2677 H 3750. *Leporis* 28

R.A. $5^h\ 15^m\ 20^s$ Decl. $-21°\ 22'$

1911.851	283°.5	4″.39
11.914	280.7	4.33
11.922	281.5	....
12.877	279.9	4.36
1912.141	281.4	4.36

No change since 1879. Herschel's angle was probably too large.

2680 Σ 691

R.A. $5^h\ 15^m\ 21^s$ Decl. $+31°\ 3'$

1911.963	299°.7	25″.63
11.966	299.9	25.39
11.988	300.1	25.50
1911.972	299.9	25.51

Fixed.

2683 Σ 693

R.A. $5^h\ 15^m\ 37^s$ Decl. $-2°\ 10'$

1910.898	7°.5	3″.89
10.911	8.2	3.77
10.933	7.8	3.59
1910.914	7.8	3.75

Without change.

2689 A.G. 94

R.A. $5^h\ 16^m\ 24^s$ Decl. + 39° 38′

1911.832	106°.1	3″.12
11.873	106.5	3.12
11.925	103.0	3.15
11.927	102.8	3.15
1911.889	104.6	3.14

Apparently unchanged.

2697 H 364 = Ku 22

R.A. $5^h\ 17^m\ 1^s$ Decl. + 22° 2′

1912.064	141°.5	10″.76
12.103	143.6	10.70
12.108	143.4	10.63
1912.092	142.8	10.70

No measures since β G. C. Fixed.

2705 Σ 701. *Orionis* 88

R.A. $5^h\ 17^m\ 33^s$ Decl. − 8° 32′

1910.898	141°.0	6″.35
10.911	138.8	6.31
10.933	140.7	6.32
1910.914	140.2	6.33

No evidence of relative motion.

2707 O. Stone 10

R.A. $5^h\ 17^m\ 55^s$ Decl. − 10° 32′

1910.933	123°.2	1″.20
11.106	120.6	1.08
11.139	121.9	1.13
1911.059	121.9	1.14

No motion since discovery in 1877.

2712 Dawes 5. *η Orionis*

R.A. $5^h\ 18^m\ 27^s$ Decl. − 2° 30′

1910.933	82°.6	1″.71
10.971	81.2	1.41
11.106	85.6	1.51
11.139	81.2	1.35
11.158	80.2	1.31
11.774	84.1	1.72
11.821	87.0	1.40
1911.272	83.1	1.49

1910.13	84°.2	1″.42	2n	Lau
1910.30	79.7	1.55	3n	Ol

[Lau (*A. N.* 4436) . . . Olivier (*Bull. L. O.* 190)]

These recent observations make the distance greater and the angle perhaps smaller.

2713 Σ 706

R.A. $5^h\ 18^m\ 37^s$ Decl. + 30° 15′

1911.717	41°.7	3″.71
11.766	41.3	3.67
11.777	38.3	3.74
1911.753	40.4	3.71

There is apparently no motion.

2738 Σ 704

R.A. $5^h\ 20^m\ 48^s$ Decl. + 69° 34′

1911.725	14°.8	20″.49
11.755	15.4	20.52
11.777	14.1	20.37
1911.752	14.8	20.46

The measures are in good agreement with the known proper motion given by β as 0″.084 in 348°.2.

2740 β 890

R.A. $5^h\ 20^m\ 49^s$ Decl. + 37° 41′

1911.766	287°.1	1″.24
11.821	287.5	1.25
11.851	287.7	1.36
1911.813	287.4	1.28

No evidence of motion.

2743 H 700

R.A. $5^h\ 21^m\ 12^s$ Decl. + 10° 41′

1911.016	239°.6	11″.72
11.172	239.5	11.60
11.717	239.9	11.58
1911.302	239.7	11.63

1908.55	240°.9	11″.13	3n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

No early measures.

2744 β 319 (7.8 . . . 10.5)

R.A. $5^h\ 21^m\ 15^s$ Decl. − 20° 49′

1911.810	227°.1	4″.16
11.851	230.4	4.01
11.914	227.3	4.16
1911.858	228.3	4.11

Apparently fixed.

2756 OΣ 108

R.A. $5^h\ 22^m\ 18^s$ Decl. + 18° 26′

1910.898	134°.8	3″.62
11.016	133.1	3.68
11.021	130.6	3.74
11.106	129.7	....(a)
1911.010	132.1	3.68

(a) Moon about 8° distant. Thus far unchanged.

2761 H 3274

R.A. $5^h\ 22^m\ 41^s$ Decl. + 18° 13′

1910.898	107°.1	5″.42
11.016	106.7	5.31
11.021	107.1	5.48
1910.978	107.0	5.40

Probably unchanged.

2769 β 320. β *Leporis*

R.A. $5^h\ 23^m\ 6^s$ Decl. − 20° 51′

1911.810	302°.8	2″.73

Very slow direct motion.

2784 H 2270

R.A. $5^h\ 24^m\ 59^s$ Decl. − 4° 21′

1911.922	339°.1	27″.79
11.963	338.7	27.74
11.988	339.1	27.84
1911.958	339.0	27.79

No early measures.

2787 Σ 727

R.A. $5^h\ 25^m\ 4^s$ Decl. + 44° 42′

1911.755	59°.3	2″.40
11.766	61.1	2.43
11.873	60.6	2.36
1911.798	60.3	2.40

No significant change.

2794 H 3765

R.A. $5^h\ 25^m\ 35^s$ Decl. − 19° 31′

1910.936	358°.2	21″.10
10.969	357.2	21.07
10.985	358.3	21.58(a)
11.005	357.5	21.16
1910.974	357.8	21.23

(a) Seeing very bad.

The angle is possibly larger than when first measured.

2797 Hd 72

R.A. $5^h\ 26^m$: Decl. − 23° 22′:

1910.936	1°.9	20″.42
10.969	1.7	20.17
10.985	1.8	21.12(a)
1910.963	1.8	20.57

(a) Very poor seeing.

No change. No early measures.

2798 H 2269. BD 56° (1039)

R.A. $5^h\ 26^m\ 7^s$ Decl. + 56° 36′

1912.757	217°.7	34″.67
12.839	218.1	34.83
12.845	218.2	34.71
1912.814	218.0	34.74

1908.44	217°.6	34″.62	4n	Bies

[Van Biesbroeck (*Ann. Observ. Belgique*, N. S. XIII)]

Probably unchanged. No early measures.

2799 H 2271 (9.2 ... 10.3)

R.A. $5^h\ 26^m\ 11^s$ Decl. − 7° 54′

1912.946	254°.5	18″.91
12.979	254.0	18.80
13.033	253.7	18.95
1912.986	254.1	18.89

A star (12.3) in 340° : 35″. Unchanged. No early measures.

2800 A. G. 95

R.A. $5^h\ 26^m\ 18^s$ Decl. + 35° 44′

1912.856	16°.3	24″.92
12.872	14.6	25.07
12.880	14.6	25.08
1912.869	15.2	25.02

No motion.

13069 A 1036. BD 44° (1239) (8.5 ... 10.7)

R.A. $5^h\ 26^m\ 36^s$ Decl. + 44° 51′

1911.755	186°0	4″04
11.766	185.7	4.14
11.873	186.0	3.96
1911.798	185.9	4.05

No evidence of motion.

2804 β 1048

R.A. $5^h\ 26^m\ 37^s$ Decl. − 1° 41′

1912.023	354°7	2″42
12.814	355.4	2.33
12.828	352.6	2.61
1912.555	354.2	2.45

Apparently fixed.

2805 A. G. 96

R.A. $5^h\ 26^m\ 49^s$ Decl. + 2° 23′

1912.023	233°1	5″22
12.031	233.6	5.40
12.814	233.2	5.28
1912.289	233.3	5.30

The distance may be increasing.

2807 Σ 735

R.A. $5^h\ 27^m\ 2^s$ Decl. − 6° 35′

1912.946	352°0	43″33
12.979	351.3	.....
13.025	351.4	43.33
13.033	351.5	43.27
1912.996	351.5	43.31

Change due to proper motion.

2809 Es 63 (8.2 ... 11.5)

R.A. $5^h\ 27^m\ 15^s$ Decl. + 41° 13′

1912.795	171°6	8″27
12.828	171.7	8.09
12.839	175.4	8.16
1912.821	172.9	8.17

Without motion.

2810 A. G. 97

R.A. $5^h\ 27^m\ 19^s$ Decl. + 33° 53′

1912.001	264°9	2″18
12.004	266.7	2.27
12.031	264.2	2.29
1912.012	265.3	2.25

No evidence of motion.

2815 Tucker

R.A. $5^h\ 27^m\ 43^s$ Decl. + 13° 55′

1912.001	50°3	5″28
12.004	50.0	5.10
12.031	51.1	5.22
1912.012	50.5	5.20

The measures of distance are discordant.

2821 Σ 738. λ *Orionis*

R.A. $5^h\ 28^m\ 32^s$ Decl. + 9° 51′

A and B

1911.993	43°6	4″54
12.004	42.8	4.57
12.314	40.9	4.90(a)
12.814	43.7	4.48(a)
12.828	44.6	4.45
1912.391	43.1	4.59

A and C

1912.004	182°9	28″74
12.814	182.8	28.57(a)
12.828	183.0	28.66
1912.549	182.9	28.66

(a) Very poor seeing.
Relatively fixed.

2826 Σ 736

R.A. $5^h\ 28^m\ 36^s$ Decl. + 41° 45′

1912.795	352°1	2″57
12.828	349.1	2.57
12.839	350.8	....
12.861	354.7	2.58
1912.831	351.7	2.57

Very slow direct motion.

.... BD 13° (957) (8.5 ... 11.4)

R.A. $5^h\ 35^m\ 23^s$ Decl. + 13° 33′

1912.001	101°.2	5″.89
12.004	100.2	6.04
12.031	100.4	6.08
1912.012	100.6	6.00

np **2931** = A 118.

2931 A 118

R.A. $5^h\ 37^m\ 24^s$ Decl. + 13° 16′

1912.001	357°.4	2″.72
12.004	357.1	2.64
12.031	356.1	2.73
1912.012	356.9	2.70

Apparently unchanged.

.... SD − 12° (1281) (8.3 ... 12.0)

R.A. $5^h\ 44^m\ 12^s$ Decl. − 12° 16′

1910.200	305°.1	9″.08
10.217	304.0	8.93
10.933	303.9	9.05
1910.450	304.3	9.02

North of **2993** = Hn 78. There is a star (13.0) in 290° : 46″.

3164 Σ 846

R.A. $6^h\ 1^m\ 10^s$ Decl. + 2° 9′

1910.739	135°.8	13″.12
10.824	136.7	13.34
10.859	135.2	12.98
1910.807	135.9	13.15

Possibly very slow retrograde motion with increasing distance.

3166 H 2296

R.A. $6^h\ 1^m\ 20^s$ Decl. + 31° 17′

1911.963	119°.8	9″.38
11.966	119.2	9.25
11.977	119.4	9.23
1911.969	119.5	9.29

No change since 1877.

3189 A. G. 106

R.A. $6^h\ 3^m\ 5^s$ Decl. + 33° 4′

A and B

1911.823	291°.3	18″.06
11.914	291.0	18.35
11.922	290.0	18.28
1911.886	290.8	18.23

Not noted in β G. C.

A and C

1911.823	215°.3	27″.22
11.914	215.2	27.26
11.922	216.4	27.08
1911.886	215.6	27.19

Fixed.

3190 Σ 859

R.A. $6^h\ 3^m\ 11^s$ Decl. + 5° 41′

1909.917	.....	37″.19
09.953	246°.1	37.54
09.958	244.1	.....
09.967	244.9	37.16
1909.949	245.3	37.30

Retrograde motion with increasing distance. Proper motion.

3192 ♅ VI 114

R.A. $6^h\ 3^m\ 21^s$ Decl. + 15° 56′

1910.000	107°.7	.....(a)
10.006	107.0	.....(a)
10.088	108.0	55″.29
10.739	107.4	54.92
10.859	107.5	54.91
1910.338	107.5	55.04

(a) Clouds.

Probably unchanged.

3214 Σ 871

R.A. $6^h\ 5^m\ 27^s$ Decl. − 0° 44′

1910.769	305°.6	7″.39
10.777	304.3	7.48
10.824	305.0	7.82
10.835	305.9	7.48
11.988	306.7	7.48
1911.039	305.5	7.53

Little change, if any.

3225 Σ 873

R.A. $6^h\ 6^m\ 33^s$ Decl. − 1° 16′

1910.936	292°.4	8″.52
10.944	292.9	8.55
10.969	292.7	8.80
1910.950	292.7	8.62

The distance is apparently increasing.

3227 Σ 875

R.A. $6^h\ 6^m\ 37^s$ Decl. − 13° 7′

1910.824	325°.4	5″.54
10.936	326.7	5.34
10.944	324.4	5.31
1910.901	325.5	5.40

Probably unchanged. The measures are discordant.

3241 H 2302. 71 *Orionis*

R.A. $6^h\ 7^m\ 46^s$ Decl. + 19° 12′

1911.963	201°.1	27″.44
12.015	202.4	27.41(a)
12.116	201.9	27.38
1912.031	201.8	27.41

(a) Temperature = − 16° F.

A faint pair with similar angle and distance 70″ ± preceding. Previously measured by Englehardt and β. Decreasing distance due to proper motion.

3250 Σ 876

R.A. $6^h\ 8^m\ 44^s$ Decl. + 53° 42′

1910.744	45°.0	8″.28
10.810	44.7	8.28
11.062	45.2	8.31
1910.872	45.0	8.29

There is evidence of retrograde motion with increasing distance.

3251 β 323

R.A. $6^h\ 8^m\ 44^s$ Decl. − 1° 41′

1910.911	97°.1	2″.18
10.933	97.3	2.34
10.936	95.8	2.34
11.941	98.0	2.37
1911.180	97.1	2.31

No change.

.... A 1730. BD 54° (1009) (9.2 ... 11.1)

R.A. $6^h\ 9^m\ 19^s$ Decl. + 54° 13′

1910.810	111°.8	3″.01		
11.062	112.8	3.12		
12.116	111.7	3.06		
1911.329	112.1	3.06		
1908.12	113°.2	2″.75	2n	A

[Aitken (*Bull. L. O.* 134)]

3260 β 567. *Monocerotis* 23

R.A. $6^h\ 9^m\ 34^s$ Decl. − 4° 53′

1910.769	243°.4	3″.87
10.936	242.6	4.13
10.969	242.6	4.45
11.005	242.4	4.27
1910.920	242.7	4.18

Possibly very slow retrograde motion.

3270 Σ 885

R.A. $6^h\ 10^m\ 26^s$ Decl. + 6° 2′

1910.739	296°.5	10″.24
10.769	296.3	10.15
10.824	297.1	10.17
1910.777	296.6	10.19

Change is doubtful.

3283 Hu 108 (9.4 ... 10.9)

R.A. $6^h\ 11^m\ 42^s$ Decl. − 10° 41′

A and B

1911.810	328°.7	3″.50
11.837	329.6	3.44
11.851	329.8	3.38
1911.833	329.4	3.44

No motion since discovery.

A and C (11.8)

1911.810	255°.9	31″.89
11.837	256.8	31.79
11.851	257.8	31.94
1911.833	256.8	31.87

There are no prior measures of C.

3285 H 2310

R.A. $6^h\ 11^m\ 48^s$ Decl. $-4°\ 12'$

1911.810	251°.4	22″.14
11.837	251.7	22.05
11.851	251.5	22.04
1911.833	251.5	22.08

No change. No early measures.

3286 Es —

R.A. $6^h\ 11^m\ 58^s$ Decl. $+55°\ 2'$

1910.777	204°.1	9″.47
10.788	25.5	9.48
10.796	24.2	9.85
1910.787	24.6	9.60

The stars are of equal magnitude. Fixed.

3290 Ho 230

R.A. $6^h\ 12^m\ 6^s$ Decl. $+13°\ 49'$

1911.106	54°.9	1″.80
11.147	60.1	1.81
11.172	55.1	1.56
11.196	56.2	1.80
1911.155	56.6	1.74

No change since Doolittle's measure of 1903.

3295 H 385

R.A. $6^h\ 12^m\ 31^s$ Decl. $+22°\ 9'$

1911.821	51°.1	1″.72
11.823	51.5	1.81
11.851	51.4	1.84
1911.832	51.3	1.79

Several stars near; 4″ and 15″ following and 9″ north preceding. No change in AB.

3296 Hu 452

R.A. $6^h\ 12^m\ 33^s$ Decl. $+22°\ 21'$

1911.766	340°.0	2″.70
11.821	339.7	2.63
11.823	340.6	2.73
1911.803	340.1	2.69

Fixed.

3297 A. G. 109

R.A. $6^h\ 12^m\ 34^s$ Decl. $+21°\ 31'$

1911.766	21°.6	2″.11
11.821	22.3	2.02
11.823	22.1	1.99
1911.803	22.0	2.04

Perhaps slight retrograde motion.

3304 H 2312

R.A. $6^h\ 13^m\ 28^s$ Decl. $-5°\ 14'$

1910.944	195°.3	9″.60
10.969	195.4	9.39
11.005	195.0	9.41
1910.973	195.2	9.47

Unchanged. No early measures.

3320 H 725 (8.2 ... 11.2)

R.A. $6^h\ 14^m\ 24^s$ Decl. $+9°\ 47'$

1911.823	71°.3	23″.79
11.832	71.4	23.68
11.837	70.8	23.74
1911.831	71.2	23.74

1908.18	69°.9	24″.33	2n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

There is considerable difference in distance in these recent measures.

3332 Σ 3116. *Monocerotis* 33

R.A. $6^h\ 15^m\ 49^s$ Decl. $-11°\ 43'$

A and B

1911.963	23°.9	4″.47
12.004	23.0	4.23
12.015	23.1	4.27
1911.994	23.3	4.32

Probably unchanged. Erratic measures.

A and C

1911.963	273°.6	56″.51
12.004	273.8	56.64
12.015	273.3	56.48
1911.994	273.6	56.54

No earlier measures.

3334 A. G. 110

R.A. $6^{h}\ 15^{m}\ 55^{s}$ Decl. + 37° 37′

1912.795	326°.5	10″.92
12.861	326.7	10.71
12.872	325.6	10.76
1912.843	326.3	10.80

No change.

3348 A. G. 111

R.A. $6^{h}\ 17^{m}\ 4^{s}$ Decl. + 31° 53′

1911.821	163°.5	7″.23
11.873	163.6	7.17
11.914	162.7	7.20
11.916	162.1	7.06
1911.881	163.0	7.17

Fixed.

3349 Σ 900. 8 *Monocerotis*

R.A. $6^{h}\ 17^{m}\ 25^{s}$ Decl. + 4° 39′

1910.944	26°.5	13″.15
10.969	26.2	13.37
11.057	26.2	13.22
1910.990	26.3	13.25

The distance is possibly less in recent measures.

3350 Es 65

R.A. $6^{h}\ 17^{m}\ 35^{s}$ Decl. + 41° 39′

1912.795	84°.7	2″.14
12.872	87.6	2.52
12.976	84.0	2.36
1912.881	85.4	2.34

Espin's first observations make the distance 1″.6.

3351 O. Stone 13. SD − 15° (1336)

R.A. $6^{h}\ 17^{m}\ 56^{s}$ Decl. − 15° 49′

A and B

1911.823	319°.4	6″.62
11.832	318.4	6.62
11.837	318.6	6.56
1911.831	318.1	6.60

Considerable increase in distance.

A and C

1911.823	323°.7	14″.69
11.832	323.5	14.62
11.837	323.1	14.48
1911.831	323.4	14.60

3355 β 97

R.A. $6^{h}\ 18^{m}\ 29^{s}$ Decl. − 1° 21′

1911.914	265°.8	1″.15(a)
11.941	259.1	1.11
11.947	261.0	1.11
1911.934	262.0	1.12

(a) Very difficult, bad seeing.
Apparently unchanged.

3360 S 518

R.A. $6^{h}\ 18^{m}\ 59^{s}$ Decl. − 16° 10′

1911.057	87°.6	16″.43
11.202	87.4	16.49
11.823	88.9	16.69
1911.361	88.0	16.54

The measures are very erratic.

3362 A 324

R.A. $6^{h}\ 19^{m}\ 9^{s}$ Decl. − 4° 22′

1912.023	353°.8	1″.11

No change as yet.

3372 OΣ 140

R.A. $6^{h}\ 19^{m}\ 45^{s}$ Decl. + 15° 35′

1912.001	120°.6	3″.10
12.004	121.5	3.19
12.010	120.9	3.16(a)
12.023	120.8	3.04(b)
1912.009	120.9	3.12

(a) Temperature = − 6° F. (b) − 8° F.
No certain evidence of motion.

3376 Hu 110

R.A. $6^{h}\ 20^{m}\ 19^{s}$ Decl. − 10° 5′

1912.023	133°.0	2″.33
12.877	132.3	2.36
12.946	129.2	2.42
1912.615	131.5	2.37

A star (10.4) in 215° : 50″.
The interval is too short to reveal motion.

3384 A. G. 113

R.A. 6ʰ 20ᵐ 38ˢ Decl. + 31° 20′

1912.946	314°.9	10″.98
12.951	315.0	10.88
12.976	314.9	10.97
1912.958	314.9	10.94

A faint star in 312° : 25″. Fixed.

3386 Es 66. BD 58° (935)

R.A. 6ʰ 21ᵐ 34ˢ Decl. + 58° 23′

1912.839	277°.4	2″.57
12.875	95.2	2.64
12.951	274.6	2.57
1912.888	275.7	2.59

No motion.

3396 Σ 915

R.A. 6ʰ 21ᵐ 50ˢ Decl. + 5° 21′

A and B

1912.001	40°.0	6″.16
12.004	40.0	6.20
12.010	41.1	6.16
1912.005	40.4	6.17

Entirely fixed.

A and C

1912.001	126°.8	39″.15
12.004	126.8	39.34
1912.002	126.8	39.24

Mentioned by Σ.

3398 A. G. 114

R.A. 6ʰ 21ᵐ 52ˢ Decl. + 8° 38′

1912.891	359°.4	4″.97
12.946	358.8	5.06
12.951	359.2	4.93
1912.929	359.1	4.99

Fixed.

3399 A. G. 115

R.A. 6ʰ 22ᵐ 35ˢ Decl. + 30° 31′

1912.891	352°.6	4″.18
12.951	351.5	4.42
12.976	352.9	4.24
1912.939	352.3	4.28

Fixed.

3422 OΣ 143

R.A. 6ʰ 24ᵐ 12ˢ Decl. + 17° 1′

A and B

1912.891	103°.2	8″.13
12.946	103.3	8.18
12.951	103.4	8.25
1912.929	103.3	8.19

Fixed.

A and C (9.9)

1912.891	343°.0	42″.78
12.946	342.7	42.67
12.951	342.9	42.78
1912.929	342.9	42.74

3456 OΣ 148

R.A. 6ʰ 26ᵐ 57ˢ Decl. + 37° 9′

1912.976	69°.7	2″.89
13.036	70.4	2.82
13.064	70.6	2.76
1913.025	70.2	2.82

Fixed. In β G. C. II the angle for Hussey's measure of 1898 should be 72°.5.

3460 Σ 932

R.A. 6ʰ 27ᵐ 31ˢ Decl. + 14° 51′

1912.891	323°.6	2″.43
12.946	323.3	2.30
12.951	324.8	2.39
1912.929	323.9	2.37

Retrograde motion.

3462 Σ 923 *rej.*

R.A. 6ʰ 27ᵐ 32ˢ Decl. + 59° 31′

1909.060	144°.2	30″.65	40(a)
09.112	145.8	30.21	12
09.140	143.8	30.53	12
1909.104	144.6	30.46	

(a) Objective fogged.
Probably fixed.

3471 H 394

R.A. $6^{h}\ 28^{m}\ 22^{s}$ Decl. − 2° 59′

1910.000	332°.2	.....
10.969	332.7	57″.73
11.057	333.1	57.53
11.196	332.9	57.43
1910.806	332.7	57.56

No early measures.

3522 Howe 14

R.A. $6^{h}\ 32^{m}\ 38^{s}$ Decl. − 14° 0′

1909.173	32°.3	8″.89	12
09.911	32.5	8.93	
09.994	32.0	9.16	
11.922	35.3	9.16	
1910.250	33.0	9.04	

Apparently fixed.

3541 Σ 946

R.A. $6^{h}\ 34^{m}\ 15^{s}$ Decl. + 59° 34′

1909.060	126°.8	4″.35	40(a)
09.112	128.3	4.20	12
09.140	130.2	4.16	12
1909.104	128.4	4.24	

(a) Objective fogged.
Little change.

3559 Σ 948. 12 *Lyncis*

R.A. $6^{h}\ 35^{m}\ 38^{s}$ Decl. + 59° 34′

A and B

1909.112	112°.4	1″.82	12
09.140	112.2	1.80	12
09.162	112.4	1.65	12
1909.138	112.3	1.76	

Binary.

A and C

1909.112	305°.7	8″.33	12
09.140	307.3	8.45	12
09.162	306.8	8.58	12
1909.138	306.6	8.45	

No relative motion.

3596 A. G. Clark 1. Sirius

R.A. $6^{h}\ 39^{m}\ 53^{s}$ Decl. − 16° 33′

1909.162	93°.4	8″.79	12
09.173	95.4	8.55	12
09.911	90.9	9.13	
10.063	93.0	9.33	
10.102	90.1	9.25	
10.151	91.2	9.85	
10.164	92.1	9.69	(a)
10.211	91.5	....	
10.750	90.6	9.75	
10.835	91.6	9.71	
10.994	89.4	9.93	
11.016	89.1	9.84	(a)
11.095	89.0	9.38	(b)
11.111	88.3	9.50	
11.172	88.9	9.45	
11.766	86.6	9.91	
11.941	87.4	9.84	
11.947	87.4	9.87	
11.949	85.7	9.73	(a)
12.015	87.5	9.87	(c)
12.946	84.5	10.51	(b)
13.064	82.7	10.03	
13.102	82.6	10.25	
13.116	83.9	10.31	
13.954	79.4	10.40	
14.151	81.9	10.31	
1909.167	94.4	8.67	2n
1910.100	91.5	9.45	6n
1910.996	89.6	9.65	7n
1911.924	86.9	9.84	5n
1913.057	83.4	10.27	4n
1914.052	80.6	10.35	2n

(a) Seeing very good. (b) Difficult, seeing poor. (c) Temperature = − 12° F.

All of the above measures with the exception of the first two were made with the 18½-inch refractor, with which the companion was first seen. With fair seeing it is now an easy object.

3612 Es 15

R.A. $6^{h}\ 41^{m}\ 10^{s}$ Decl. + 46° 19′

1907.758	275°.2	29″.55	12
08.255	275.4	29.94	12
08.282	275.2	29.29	12
1908.098	275.3	29.59	

Espin's original measures make the distance too small; otherwise there has been considerable motion.

3732 Σ 994

R.A. $6^h\ 51^m\ 21^s$ Decl. + 37° 16′

1907.758	56°.4	26″.43	12
08.255	55.8	26.36	12
08.282	55.9	26.32	12
1908.098	56.0	26.37	

The distance is increasing.

3835 Hu 48

R.A. $7^h\ 0^m\ 34^s$ Decl. − 12° 46′

1910.859	148°.6	2″.97
10.911	146.1	2.97
10.933	147.4	2.82
1910.901	147.4	2.92

Probably unchanged.

3857 H 3930

R.A. $7^h\ 2^m\ 48^s$ Decl. − 12° 59′

1910.859	72°.8	15″.36
10.911	72.6	16.13(a)
11.005	72.3	15.63
11.095	71.8	15.26
1910.968	72.4	15.59

(a) Clouds, very bad seeing, very faint.
Probably fixed.

3858 Σ 1025

R.A. $7^h\ 2^m\ 56^s$ Decl. + 56° 0′

1909.826	135°.2	24″.22
09.845	135.4	24.37
09.865	134.2	24.52
1909.845	134.9	24.37

Retrograde motion with increase in distance.

3882 Weisse 14

R.A. $7^h\ 5^m\ 58^s$ Decl. + 15° 23′

1910.211	154°.6	2″.40
10.217	154.9	2.49
10.340	160.0	2.33
1910.256	156.5	2.41

Apparently no change.

3885 A. G. Wien

R.A. $7^h\ 6^m\ 1^s$ Decl. − 7° 26′

1911.832	266°.0	2″.46
11.851	266.6	2.40
11.922	265.6	2.40
1911.868	266.1	2.42

No evidence of motion.

3899 Σ 1045

R.A. $7^h\ 6^m\ 42^s$ Decl. − 2° 58′

1911.823	232°.0	5″.92
11.832	230.3	6.05
11.851	231.4	5.82
1911.835	231.2	5.93

Unchanged.

3900 H 2365. BD 3° (1599)

R.A. $7^h\ 6^m\ 44^s$ Decl. + 3° 36′

A and B

1911.963	138°.1	18″.34
11.988	137.2	18.48
12.023	138.7	18.49(a)
1911.991	138.0	18.44

Probably unchanged.

A and C

1911.963	47°.5	20″.73
11.988	47.2	20.70
12.023	46.5	20.69(a)
1911.991	47.1	20.71

(a) Temperature = − 8° F.
No earlier measures of C.

3908 Σ 1039

R.A. $7^h\ 7^m\ 27^s$ Decl. + 63° 44′

1910.744	206°.2	3″.10
10.777	204.4	3.16
10.788	204.3	3.22
1910.770	205.0	3.16

Fixed.

3913 Σ 1046

R.A. $7^h\ 7^m\ 50^s$ Decl. + 14° 46′

1911.823	237°.1	10″.63
11.851	237.4	10.64
11.916	235.9	10.77
1911.863	236.8	10.68

Fixed.

.... SD − 19° (1762) (10.7 ... 11.4)

R.A. $7^h\ 8^m\ 24^s$ Decl. − 19° 53′

1910.200	280°.9	5″.09
10.994	284.6	5.97
1910.597	282.7	5.53

A faint pair *sf* **3910** = Hn 85.

3933 Pritchett

R.A. $7^h\ 9^m\ 21^s$ Decl. + 14° 50′

A and B

1911.823	219°.6	8″.18
11.851	40.8	8.10
11.916	40.0	8.35
1911.863	40.1	8.21

Considerable change in distance if the original single night's measure is reliable.

A and C (9.4)

1911.851	278°.7	72″.54
11.916	277.5	73.38
1911.883	278.1	72.96

B and C

1912.031	272°.4	77″.24
12.174	272.3	77.26
1912.102	272.3	77.25

Other fainter stars nearer.

3935 Σ 1056

R.A. $7^h\ 9^m\ 30^s$ Decl. − 1° 39′

1910.217	297°.9	4″.16
10.266	298.7	3.74
10.302	296.7	4.10
1910.262	297.8	4.00

Fixed.

3938 Howe 17

R.A. $7^h\ 9^m\ 39^s$ Decl. − 0° 25′

1910.217	313°.5	2″.57
10.266	313.8	2.51
10.302	313.1	2.82
1910.262	313.5	2.63

Fixed.

3947 Σ 1060

R.A. $7^h\ 10^m\ 22^s$ Decl. − 9° 3′

A and B

1910.217	22°.1	7″.30
10.835	23.7	7.11
10.859	22.7	7.05
1910.637	22.8	7.15

No change.

A and C (11.0)

1910.217	263°.9	21″.84
10.835	262.7	21.63
10.859	263.3	21.72
1910.637	263.3	21.73

There are no prior observations of C.

3948 Σ 1055. 47 *Camelopardalis*

R.A. $7^h\ 9^m\ 46^s$ Decl. + 60° 7′

1910.777	329°.3	2″.40
10.999	324.9	2.52
11.106	321.9	2.58
11.966	326.7	2.34
1911.212	325.7	2.46

Retrograde motion.

3949 OΣ 170

R.A. $7^h\ 11^m\ 5^s$ Decl. + 9° 31′

1910.884	106°.6	1″.78
10.933	106.9	1.83
11.016	286.3	1.77
1910.944	106.6	1.79

1906.15	105°.2	1″.55	3n	Doo
1909.21	105.8	1.66	3n	Do

[Doolittle (*Pub. Flower Obsy.* IV) . . . Doberck (*A. N.* 4394)]

Retrograde motion, practically rectilinear. The pair has considerable proper motion, so is undoubtedly a binary.

3954 H 3945

R.A. 7ʰ 11ᵐ 33ˢ Decl. − 23° 6′

1908.241	61°.2	27″.21	12
08.296	58.9	27.74	12(a)
09.112	60.7	27.38	12
1908.550	60.3	27.44	

(a) Seeing very poor.
Probably unchanged.

3959 Hd 102

R.A. 7ʰ 11ᵐ 46ˢ Decl. + 28° 29′

1911.916	338°.0	15″.94
11.927	338.2	15.73
11.963	338.1	15.69
1911.935	338.1	15.79

No change. No early measures.

3962 Σ 1051

R.A. 7ʰ 12ᵐ 7ˢ Decl. + 73° 19′

A and B

1911.977	275°.8	1″.51
12.229	283.6	1.25
12.270	282.5	1.25
1912.159	280.6	1.34

Direct motion.

A and C

1911.977	82°.4	31″.46
12.229	82.4	31.39
12.261	82.5	31.62
1912.156	82.4	31.49

No significant change.

3972 Σ 1068

R.A. 7ʰ 13ᵐ 4ˢ Decl. + 13° 36′

1910.933	347°.5	4″.02
11.005	347.3	4.21
11.016	348.1	4.05
1910.985	347.6	4.09

Very slow retrograde motion.

3977 Σ 1070

R.A. 7ʰ 13ᵐ 31ˢ Decl. + 34° 15′

1911.021	320°.5	1″.83
11.158	318.2	....
11.821	320.3	1.83
1911.333	319.7	1.83

Fixed.

3981 H 3949

R.A. 7ʰ 13ᵐ 54ˢ Decl. − 30° 35′

1911.941	76°.6	3″.19
11.947	77.1	3.06
11.949	77.4	3.04
1911.946	77.0	3.10

Fixed.

3991 Σ 1071

R.A. 7ʰ 14ᵐ 22ˢ Decl. + 45° 14′

1910.997	14°.8	17″.01
10.999	13.1	17.04
11.021	14.4	16.99
1911.006	14.1	17.01

Direct motion with increasing distance.

4008 Lv 4. SD − 19° (1840)

R.A. 7ʰ 16ᵐ 10ˢ Decl. − 19° 30′

1911.922	133°.9	2″.29
11.941	313.2	2.23
11.947	135.2	2.17
1911.937	314.1	2.23

The original measure was:

1889.11	129°.1	1″.96	1n	Lv

Probably fixed.

4014 H 758

R.A. 7ʰ 16ᵐ 57ˢ Decl. − 15° 20′

1911.922	243°.3	13″.47
12.048	242.2	13.80(a)
12.174	241.8	13.55
1912.048	242.4	13.61

(a) B very faint, bad seeing.
Probably unchanged.

4020 H 420

R.A. $7^h\ 17^m\ 12^s$ Decl. + 26° 55′

1912.828	6°.6	12″.01
12.946	8.6	12.06
13.064	7.2	11.98
1912.946	7.5	12.02

Only Doolittle's measures. (*Pub. Flower Obsy.* IV).

4021 H 422

R.A. $7^h\ 17^m\ 22^s$ Decl. + 26° 51′

1911.979	194°.2	23″.63
12.229	195.1	23.49
12.828	195.1	23.52
1912.345	194.8	23.55

Only Doolittle's measures. (*Pub. Flower Obsy.* IV).

4022 A 527

R.A. $7^h\ 17^m\ 23^s$ Decl. − 9° 48′

1911.851	87°.7	3″.24
11.922	85.9	3.24
11.941	85.3	3.19
1911.905	86.3	3.22

I make the distance greater than previous observers.

4024 H 2378

R.A. $7^h\ 17^m\ 27^s$ Decl. + 0° 37′

1911.988	124°.5	22″.26
12.031	124.2	22.02(a)
12.048	124.2	22.02
1912.022	124.3	22.10

(a) Temperature = − 12° F.
Probably fixed.

4034 Σ 1084 = H 423

R.A. $7^h\ 18^m\ 3^s$ Decl. − 3° 45′

1911.914	284°.5	14″.50
11.922	284.7	14.32
11.988	285.0	14.37
1911.941	284.7	14.40

The distance is increasing.

4058 Σ 1094

R.A. $7^h\ 20^m\ 36^s$ Decl. + 15° 33′

1910.933	96°.4	2″.46
10.969	96.5	2.75
11.005	96.7	2.52
1910.969	96.5	2.58

Apparently fixed.

4061 O. Stone 17

R.A. $7^h\ 20^m\ 46^s$ Decl. − 18° 8′

1911.949	75°.2	4″.88(a)
12.015	77.7	5.08
12.031	77.4	4.99(b)
1911.998	76.8	4.98

(a) B very faint. Objective frosted. (b) Temperature = − 12° F.
No motion.

4065 Σ 1093. BD 50° (1436)

R.A. $7^h\ 21^m\ 11^s$ Decl. + 50° 13′

1911.111	146°.8	0″.73
11.947	143.0	0.64
12.116	146.4	0.73
1911.725	145.4	0.70

Probably binary.

4074 β 21. η *Canis Minoris*

R.A. $7^h\ 21^m\ 35^s$ Decl. + 7° 11′

1912.015	24°.4	4″.30(a)
12.116	203.8	4.47
12.174	25.6	4.38
1912.102	24.6	4.38

(a) Temperature = − 18° F.
No significant change.

4084 OΣ (App) 86

R.A. $7^h\ 22^m\ 29^s$ Decl. + 14° 36′

1911.914	349°.1	55″.89
11.988	349.2	55.86
12.010	.....	55.84
1911.971	349.1	55.86

Fixed.

4113 Σ 1111

R.A. 7ʰ 26ᵐ 0ˢ Decl. − 8° 27′

1912.010	.....	20″.05
12.031	219°.7	20.00
12.048	219.5	20.09
1912.030	219.6	20.05

Fixed.

4122 Σ 1110. Castor

R.A. 7ʰ 26ᵐ 57ˢ Decl. + 32° 9′

A and B

1912.051	218°.7	5″.59
12.976	218.7	5.39
12.979	218.8	5.42
13.025	218.3	5.55
13.036	219.6	5.65
1912.813	218.8	5.52

A and C

1912.976	163°.9	73″.09
12.979	163.7	73.40
13.025	164.0	72.94
13.036	163.9	73.16
1913.004	163.9	73.15

4125 Σ 1114

R.A. 7ʰ 27ᵐ 8ˢ Decl. + 9° 33′

1912.031	53°.4	6″.72(a)
12.048	55.8	6.74
12.092	53.0	6.75(b)
1912.057	54.1	6.74

(a) Temperature = − 12° F. (b) − 10° F.
Fixed.

4147 S 552

R.A. 7ʰ 29ᵐ 15ˢ Decl. − 23° 13′

1908.091	289°.8	9″.26
08.241	290.8	9.32
08.296	290.9	9.29
1908.209	290.5	9.29

There is a wide divergence in estimates of relative magnitude by various observers. No change in relative position.

4441 A. G. 149

R.A. 8ʰ 0ᵐ 43ˢ Decl. + 7° 44′

1910.933	238°.1	5″.64
10.969	237.1	5.73
10.985	236.8	5.64
1910.962	237.3	5.67

Apparently unchanged.

4444 Σ 1185

R.A. 8ʰ 0ᵐ 55ˢ Decl. + 1° 42′

1911.821	281°.1	3″.93
11.823	100.2	3.95
11.914	100.4	3.93
1911.853	100.6	3.94

Apparently unchanged.

4475 Σ 1195

R.A. 8ʰ 5ᵐ 10ˢ Decl. + 30° 49′

1910.088	329°.7	9″.10
10.137	328.7	9.41
10.383	329.6	9.13
1910.203	329.3	9.21

The distance here is larger than in previous observations.

4487 H 441

R.A. 8ʰ 6ᵐ 25ˢ Decl. + 26° 5′

See page 224.

4492 Σ 1202

R.A. 8ʰ 6ᵐ 59ˢ Decl. + 11° 13′

1910.211	317°.6	2″.61
10.217	317.5	2.58
10.236	316.4	2.85
1910.221	317.2	2.68

Retrograde motion with increase of distance.

4506 H 2435

R.A. 8ʰ 7ᵐ 45ˢ Decl. − 5° 24′

1911.851	206°.2	7″.20
11.922	204.6	7.35
11.988	205.2	7.20
13.261	205.7	7.14
1912.255	205.4	7.22

No change since 1880.

4506–7 A of H 2435 to A of β 904

R.A. 8^h 7^m 45^s Decl. − 5° 24′

1911.851	220°4	79″42
11.922	219.3	79.47
11.988	219.5	79.57
1911.920	219.7	79.49

4507 = β 904 was discovered with the 18½-inch and is reserved for later publication.

4524 Σ 1210

R.A. 8^h 9^m 33^s Decl. + 3° 10′

1910.835	113°6	15″67
10.969	113.7	15.57
11.005	113.7	15.61
1910.936	113.7	15.62

Entirely fixed.

4530 H 781

R.A. 8^h 10^m 3^s Decl. + 26° 44′

1912.103	319°5	6″05
12.229	321.2	6.05
12.272	320.5	6.07
1912.201	320.4	6.06

Fixed.

4533 Σ 1212

R.A. 8^h 10^m 35^s Decl. + 31° 12′

1910.383	235°1	5″49
12.229	236.5	5.51
12.272	236.4	5.56
1911.628	236.0	5.52

Fixed.

4538 β 102

R.A. 8^h 11^m 0^s Decl. − 8° 39′

1909.911	119°9	3″28
09.953	120.6	3.24
09.958	121.8	3.22
1909.941	120.8	3.25

Fixed.

4547 Σ 1213

R.A. 8^h 11^m 32^s Decl. + 6° 50′

1910.969	317°3	7″64
10.985	316.9	....
11.005	318.3	7.35
11.079	316.7	7.20
1911.009	317.3	7.40

Retrograde motion. Change in distance is doubtful.

4548 H 444

R.A. 8^h 11^m 33^s Decl. + 19° 59′

1912.010	....	35″67(a)
12.031	97°1	36.13(b)
12.103	97.3	36.02
12.174	97.2	35.97
1912.079	97.2	35.95

(a) Temperature = − 9° F. (b) − 12° F.
Probably unchanged.

4564 H 783

R.A. 8^h 14^m 11^s Decl. + 7° 1′

1910.969	60°5	19″83
10.985	61.0	20.08
11.005	60.5	19.75
1910.986	60.7	19.89

Probably unchanged.

4581 S 565

R.A. 8^h 16^m 35^s Decl. + 42° 24′

1910.997	170°0	78″58
11.062	170.3	78.62
11.755	170.1	78.55
1911.271	170.1	78.58

Proper motion.

4595 Es 18

R.A. 8^h 18^m 49^s Decl. + 42° 30′

1909.112	234°8	11″89	12
09.140	235.8	12.11	12
09.153	235.3	12.14	12
1909.135	235.3	12.05	

Apparently fixed.

4601 Σ 1223. *φ² Cancri*

R.A. 8^h 19^m 32^s Decl. + 27° 20′

1910.137	215°7	5″19
10.211	215.6	5.15
10.244	33.1	5.43
10.340	214.4	5.27
1910.233	214.7	5.26

No certain change.

4624 Σ 1230

R.A. $8^h\ 21^m\ 37^s$ Decl. + 17° 15′

1912.010	.....	30″.91
12.031	190°.4	31.02(a)
12.103	190.2	31.12
1912.048	190.3	31.02

(a) Temperature = − 12° F.
Increase in distance.

4639 Arg 20

R.A. $8^h\ 23^m\ 15^s$ Decl. − 17° 8′

1912.010	.....	15″.45
12.048	172°.0	15.36
12.103	171.4	15.23
1912.054	171.7	15.35

Apparently fixed.

.... I 802. SD − 22° (2287) (9.3 ... 9.8)

R.A. $8^h\ 23^m\ 24^s$ Decl. − 22° 16′

1910.093	250°.3	3″.34
10.096	249.6	2.86
10.102	250.0	3.23
1910.097	250.0	3.14

These observations antedate the first measures of Innes. About 3^m *f* **4617** = Hn 96.

4656 Σ 1235

R.A. $8^h\ 24^m\ 47^s$ Decl. + 57° 20′

1909.845	78°.0	1″.19
09.898	78.2	1.32
09.909	81.0	1.31
1909.884	79.1	1.27

Entirely fixed.

4666 Σ 1243

R.A. $8^h\ 27^m\ 41^s$ Decl. + 2° 0′

1911.133	225°.2	1″.84
11.196	225.1	1.81
11.202	222.1	1.78
1911.177	224.1	1.81

No change.

13167 Hu 857. BD 15° (1850) (9.3 ... 10.8)

R.A. $8^h\ 28^m\ 53^s$ Decl. + 15° 5′

1910.093	221°.0	4″.54
10.096	220.1	4.67
10.102	219.4	4.66
1910.097	220.2	4.62

No evidence of motion.

4678 OΣ (App) 94

R.A. $8^h\ 29^m\ 31^s$ Decl. + 14° 12′

1909.044	132°.9	43″.56	40
09.112	132.2	43.59	12
09.140	132.5	43.77	12
1909.099	132.5	43.64	

Fixed.

4708 β 207

R.A. $8^h\ 33^m\ 16^s$ Decl. − 19° 19′

1911.851	106°.6	4″.69
12.010	105.7	4.64
12.015	104.1	4.63
1911.959	105.5	4.65

The stars show sharp color contrast, yellow and bluish. No motion.

4722 Hu 118

R.A. $8^h\ 34^m\ 54^s$ Decl. − 14° 14′

1912.015	323°.8	2″.20(a)
12.092	323.2	2.06
12.116	145.5	2.30
12.174	320.7	1.97(b)
1912.099	323.3	2.13

(a) Temperature = − 18° F. (b) Seeing poor. Moon bright.
Apparently fixed.

4723 Σ 1258

R.A. $8^h\ 34^m\ 56^s$ Decl. + 49° 18′

1908.296	331°.9	10″.01	12
08.304	331.8	10.04	12
08.395	330.7	9.99	12
1908.332	331.5	10.01	

Little if any change.

4727 Σ 1261

R.A. $8^h\ 35^m\ 1^s$ Decl. − 11° 30′

1912.174	302°.6	29″.75
12.308	302.5	29.68
12.322	302.5	29.71
1912.268	302.5	29.71

Without change.

4728 H 2462

R.A. $8^h\ 35^m\ 6^s$ Decl. + 12° 36′

1911.057	24°.4	14″.85
11.079	24.2	14.75
11.095	24.2	14.83
1911.077	24.3	14.81

Probably unchanged. No early measures.

4731 Ho 354

R.A. $8^h\ 35^m\ 34^s$ Decl. + 26° 29′

1911.949	174°.0	1″.17
12.001	174.7	1.02
12.116	173.5	1.08
1912.022	174.1	1.09

No change as yet.

4736 Σ 1253

R.A. $8^h\ 36^m\ 28^s$ Decl. + 72° 27′

1911.911	244°.9	26″.13
12.212	245.4	26.00
12.270	244.9	25.98
1912.131	245.1	26.04

Fixed.

4740 H 455

R.A. $8^h\ 37^m\ 4^s$ Decl. + 30° 55′

1911.021	344°.2	10″.94
11.202	342.4	10.95
11.911	343.3	11.07
1911.378	343.3	10.99

No early measures.

4744 Kr 30

R.A. $8^h\ 37^m\ 29^s$ Decl. + 58° 8′

1911.062	298°.5	1″.93
11.947	296.8	1.88
11.966	295.4	1.90
1911.658	296.9	1.90

The distance may be increasing.

4752 A 553

R.A. $8^h\ 38^m\ 40^s$ Decl. + 29° 27′

1912.187	73°.5	2″.61
12.229	69.2	2.73
12.308	69.7	2.86
1912.241	70.8	2.73

Without motion.

4753 Σ 1259

R.A. $8^h\ 38^m\ 51^s$ Decl. + 38° 56′

1911.911	338°.9	5″.19
11.966	340.9	5.16
11.977	341.1	5.15
1911.951	340.3	5.17

Without change.

4757 Kr 31

R.A. $8^h\ 39^m\ 2^s$ Decl. + 63° 38′

1911.062	277°.7	7″.21
11.911	278.3	7.27
11.925	278.2	7.32
1911.633	278.1	7.27

No motion.

4760 Σ 1270

R.A. $8^h\ 39^m\ 17^s$ Decl. − 2° 10′

1911.057	259°.9	5″.02
11.079	260.7	5.00
11.095	260.5	4.97
1911.077	260.4	5.00

Apparently fixed.

4764 H 4131

R.A. $8^h\ 39^m\ 34^s$ Decl. + 16° 15′

1911.057	139°.0	19″.98
11.079	140.1	19.80
11.095	139.9	19.75
1911.077	139.7	19.84

Probably unchanged. No early measures.

4766 Hu 119

R.A. $8^h\ 39^m\ 46^s$ Decl. − 13° 40′

1912.010	352°.5	2″.75(a)
12.015	352.9	2.82(b)
12.031	352.3	2.83
1912.019	352.6	2.80

(a) Temperature = − 9° F. (b) − 18° F.
Interval too short to show motion.

4770 H 3313

R.A. 8h 40m 9s Decl. − 11° 5′

1912.048	60°.5	35″.14(a)
12.103	61.2	35.20
12.105	60.7	35.17(a)
1912.085	60.8	35.17

(a) Temperature = − 3° F.
No early measures for comparison.

4776 Σ 1272

R.A. 8h 40m 44s Decl. + 35° 3′

1909.044	342°.6	20″.63	40
09.153	342.3	20.54	12
09.162	343.7	20.46	12
1909.120	342.9	20.54	

Fixed.

4778 Σ 1274

R.A. 8h 41m 16s Decl. + 38° 47′

1911.021	41°.8	9″.14
11.927	42.8	9.16
11.966	40.1	9.05
1911.638	41.6	9.12

No motion.

4781 Hu 121

R.A. 8h 41m 22s Decl. − 10° 27′

1912.015	99°.3	3″.96
12.092	98.6	3.75
12.116	97.1	3.92
1912.074	98.3	3.88

Interval since discovery too short to reveal change.

4782 Σ 1281

R.A. 8h 41m 26s Decl. + 0° 28′

1911.963	317°.4	36″.74
12.048	317.3	36.67(a)
12.092	317.5	36.70(b)
1912.034	317.4	36.70

(a) Temperature = − 3° F. (b) − 10° F.
Proper motion furnishes decided change.

4784 Kr 32

R.A. 8h 41m 49s Decl. + 63° 34′

1911.062	10°.2	4″.72		
11.911	10.1	4.75		
11.925	9.4	4.82		
1911.633	9.9	4.76		
1911.32	191°.8	4″.67	2n	Do

[Doberck (*A. N.* 4529)]

The distance is somewhat greater in these later measures.

4788 Σ 1275

R.A. 8h 42m 9s Decl. + 57° 58′

1911.062	193°.9	2″.29
11.927	197.7	2.33
11.947	195.9	1.91
1911.645	195.8	2.18

Star (13.0) in 78°.5 : 39″.
Fixed.

4801 H 797. SD − 14° (2663)

R.A. 8h 43m 30s Decl. − 14° 14′

1911.057	240°.6	16″.09
11.095	240.0	15.80
12.048	241.0	15.79(a)
1911.400	240.5	15.89

(a) Temperature = − 3° F.
No early measures for comparison.

4802 A. G. 156

R.A. 8h 43m 19s Decl. + 34° 44′

1911.911	250°.3	10″.88
11.927	250.9	10.88
11.966	249.6	10.66
1911.935	250.3	10.81

No change since the first measures.

4803 H 4140

R.A. 8h 43m 25s Decl. − 12° 58′

1911.057	283°.4	10″.37
11.095	284.1	10.36
12.015	285.4	10.43 (a)
12.092	284.5	10.22
1911.565	284.4	10.34

(a) Temperature = − 18° F.
No early measures.

4804 A. G. 157

R.A. 8^{h} 43^{m} 27^{s} Decl. + 23° 35′

1911.947	72°.9	2″.08
11.949	76.6	1.99
12.015	76.4	2.12 (a)
1911.970	75.3	2.06

(a) Temperature = − 18° F.

No change. Küstner's quadrant, reversed by Doolittle, is retained.

4814 H 3314. BD + 0° (2403)

R.A. 8^{h} 44^{m} 18^{s} Decl. + 0° 26′

1912.135	133°.7	16″.19
12.174	133.8	16.16
12.302	133.2	16.25
1912.204	133.6	16.20

No early measures for strict comparison.

4815 Σ 1280

R.A. 8^{h} 44^{m} 22^{s} Decl. + 71° 16′

1912.212	46°.3	4″.64
12.270	45.8	4.72
12.272	47.3	4.78
1912.251	46.5	4.71

1908.33	45°.8	4″.66	2n	Hertz
1910.08	45.3	4.73	2n	β

[Hertzsprung (*A. N.* 4299) . . . β (*Carnegie Inst.* 168)]

An interesting pair.

.... Roe 34. BD 11° (1930) (9.6 ... 11.1)

R.A. 8^{h} 45^{m} 21^{s} Decl. + 11° 45′

1910.337	345°.9	3″.68
10.340	348.8	3.68
10.351	349.0	3.31
1910.343	347.9	3.56

See *Popular Astronomy*, Vol. 18, 356.

4825 Arg 21

R.A. 8^{h} 45^{m} 29^{s} Decl. + 65° 26′

1912.940	300°.7	18″.46
12.976	120.7	18.34
12.992	119.9	18.34
1912.969	120.4	18.38

No early measures.

4829 Σ 1290

R.A. 8^{h} 45^{m} 45^{s} Decl. + 4° 55′

1912.103	318°.4	3″.40
12.105	317.4	3.35
12.116	320.4	3.26
1912.108	318.7	3.33

No change since 1834.

4832 Schj. 11

R.A. 8^{h} 46^{m} 4^{s} Decl. − 10° 41′

1912.103	248°.6	2″.40
12.105	348.2	2.42
12.116	348.4	2.37
1912.108	348.4	2.39

No change.

4833 A. G. 158

R.A. 8^{h} 46^{m} 9^{s} Decl. + 50° 21′

1912.940	336°.2	5″.46
12.976	337.0	5.25
12.992	336.3	5.31
1912.969	336.5	5.34

No motion since 1901.

4835 Σ 1289

R.A. 8^{h} 46^{m} 44^{s} Decl. + 44° 3′

1912.116	4°.4	4″.05
12.270	1.8	4.05
12.272	3.8	4.05
1912.219	3.3	4.05

Apparently fixed.

4839 Σ 1291. ι^2 57 *Cancri*

R.A. 8^{h} 46^{m} 55^{s} Decl. + 31° 2′

1912.116	322°.7	1″.71
12.187	321.6	1.65
12.229	323.5	1.62
1912.177	322.6	1.66

Retrograde motion. C (12.0) 50″ *sp.*

4842 Σ 1292 (8.3 ... 8.5)

R.A. 8ʰ 47ᵐ 39ˢ Decl. − 0° 8′

1912.135	186°.2	6″.16
12.174	186.6	6.22
12.302	185.0	6.22
1912.204	185.9	6.20

No change.

4843 H 109 = Ku 34

R.A. 8ʰ 47ᵐ 43ˢ Decl. + 13° 6′

1912.064	101°.6	10″.68
12.081	101.7	10.51
12.089	102.0	10.55
1912.078	101.8	10.58

No other measures since β G. C. Fixed.

4845 A. G. 159

R.A. 8ʰ 47ᵐ 52ˢ Decl. + 33° 14′

1912.116	99°.5	6″.72
12.272	100.4	7.03
12.275	99.9	6.68
1912.221	99.9	6.81

Fixed.

4851 β 408

R.A. 8ʰ 48ᵐ 58ˢ Decl. + 63° 53′

1912.275	341°.1	3″.15
12.302	340.4	3.22(a)
12.311	339.7	3.21
1912.296	340.4	3.19

(a) Very poor seeing.
The angle is smaller in recent measures.

4944 Σ 1313

R.A. 9ʰ 2ᵐ 34ˢ Decl. + 70° 28′

1911.949	263°.2	1″.00
11.977	263.7	1.14
12.253	261.5	0.99
1912.060	262.8	1.04

Direct motion.

4953 Hu 227

R.A. 9ʰ 3ᵐ 20ˢ Decl. − 13° 42′

1910.217	216°.0	2″.36
12.015	213.5	2.58
12.092	213.6	2.45
1911.441	214.4	2.46

No change since discovery.

.... Es 296. BD 36° (1932) (8.4 ... 11.1)

R.A. 9ʰ 4ᵐ 56ˢ Decl. + 36° 52′

A and B

1913.124	170°.7	20″.52
13.261	174.3	20.57
13.264	174.3	20.40
1913.216	173.1	20.50

A and D (10.5)

1913.264	339°.3	87″.10
15.314	339.5	87.30
1914.289	339.4	87.20

Espin measures a component close to B. (*M. N.* LXVI, 430.)

4966 β 104

R.A. 9ʰ 5ᵐ 19ˢ Decl. + 0° 47′

1910.933	105°.7	3″.32
11.941	108.1	3.41
12.092	106.7	3.31
1911.655	106.8	3.35

No certain evidence of motion. Conflicting measures.

4968 Σ 1318

R.A. 9ʰ 5ᵐ 33ˢ Decl. + 47° 29′

1910.744	240°.4	3″.24
10.777	241.0	3.07
10.788	239.1	3.19
1910.770	240.2	3.17

Possibly retrograde motion with decreasing distance.

4969 Σ 1322

R.A. 9ʰ 5ᵐ 59ˢ Decl. + 18° 1′

1910.933	53°.6	1″.78
10.994	50.9	1.87
11.005	49.5	1.59
1910.977	51.3	1.75

Entirely fixed.

4987 Σ 1327

R.A. $9^h\ 8^m\ 26^s$ Decl. + 28° 25′

A and B

1911.911	74°.2	10″.92
11.927	74.1	11.01
11.966	72.3	11.09
12.116	72.4	10.92
1911.980	73.2	10.99

Retrograde motion with decreasing distance.

A and C

1911.911	23°.2	26″.58
11.927	22.7	26.43
11.966	22.1	26.47
12.116	22.2	26.55
1911.980	22.5	26.51

Retrograde motion with increasing distance.

C and D (14.0)

1913.102	350°.2	2″.21
13.110	354.8	2.39
13.118	346.8	2.05
1913.110	350.6	2.22

No prior measures of D.

4990 β 455

R.A. $9^h\ 8^m\ 34^s$ Decl. + 4° 43′

1911.963	67°.6	2″.02
12.092	71.7	2.11
12.103	70.5	2.06
1912.053	69.9	2.06

Change is uncertain.

4993 Weisse 21

R.A. $9^h\ 9^m\ 1^s$ Decl. − 8° 16′

1911.963	14°.7	26″.30
12.105	14.3	26.19
12.108	13.9	26.13
1912.059	14.3	26.21

Fixed.

5001 β 212. *Hydrae* 95

R.A. $9^h\ 10^m\ 11^s$ Decl. − 7° 51′

1912.108	216°.9	1″.40(a)
12.185	217.0	1.71
12.212	217.8	1.34
1912.168	217.2	1.48

(a) Temperature = − 10° F.
Unmistakable retrograde motion.

5003 Σ 1332

R.A. $9^h\ 10^m\ 24^s$ Decl. + 24° 9′

1910.985	20°.1	6″.01
10.994	20.7	5.94
11.005	20.5	5.88
1910.995	20.4	5.94

No change. Many recent measures.

5007 H 4193

R.A. $9^h\ 10^m\ 55^s$ Decl. − 22° 38′

1908.277	119°.8	3″.34	12
09.953	118.2	3.09	
09.958	117.1	2.97	
09.967	118.1	3.38	
1909.539	118.3	3.19	

No early measures. Herschel's angle was 126°.4.

5009 Hd 122. SD − 9° (2787) (9.6 . . . 10.0)

R.A. $9^h\ 10^m\ 51^s$ Decl. − 9° 11′

1912.108	92°.1	8″.93
12.135	93.1	8.87
12.174	92.5	8.83
1912.139	92.6	8.88

No early measures.

5014 Σ 1334. 38 *Lyncis*

R.A. $9^h\ 11^m\ 23^s$ Decl. + 37° 19′

1911.927	234°.9	3″.50
11.941	234.4	2.98
11.947	231.4	2.97
11.949	232.4	2.94
1911.941	233.3	3.10

Retrograde motion.

5022 Hu 126

R.A. $9^h\ 12^m\ 20^s$ Decl. − 11° 49′

1910.994	89°.2	2″.64
11.922	87.4	2.89
11.963	87.7	3.00
1911.626	88.1	2.84

No change since discovery.

5026 A 125

R.A. $9^h\ 12^m\ 56^s$ Decl. + 9° 55′

A and B

1911.922	26°.4	3″.38
11.963	25.8	3.21
12.048	25.1	3.32(a)
12.103	26.1	3.10
1912.009	25.8	3.25

Probably unchanged.

A and C (10.3)

1911.922	82°.0	50″.99
11.963	81.9	50.72
12.048	81.8	50.68(a)
12.103	82.1	50.69
1912.009	81.9	50.77

(a) Temperature = − 3° F.
No prior measures of C.

5030 Σ 1338. *Lyncis* 157

R.A. $9^h\ 13^m\ 29^s$ Decl. + 38° 42′

1912.275	176°.6	1″.83
12.308	176.2	1.57
12.314	176.4	1.66
1912.299	176.4	1.69

Several recent measures. Direct rectilinear motion will satisfy the observations, though the pair is probably binary.

5032 Σ 1339

R.A. $9^h\ 13^m\ 31^s$ Decl. + 37° 14′

1912.275	65°.8	1″.39
12.314	66.3	1.33
12.415	67.6	1.37
1912.335	66.6	1.36

Possibly slow retrograde motion.

5038 Σ 1340

R.A. $9^h\ 14^m\ 21^s$ Decl. + 50° 3′

1908.091	317°.1	6″.15	12
08.241	317.2	6.54	12
08.255	318.5	6.28	12
1908.196	317.6	6.32	

No change.

5051 A. G. 164

R.A. $9^h\ 16^m\ 18^s$ Decl. + 38° 56′

1912.116	17°.2	4″.73
12.275	18.3	4.67
12.308	18.2	4.59
1912.233	17.9	4.66

Increase in distance noted by Doolittle is not confirmed.

5055 OΣ 200

R.A. $9^h\ 16^m\ 36^s$ Decl. + 52° 5′

1908.277	332°.5	1″.63	12
08.285	333.1	1.73	12
08.334	335.5	1.56	12
08.400	333.6	1.34	12
1908.324	333.7	1.57	

Apparently fixed.

5060 Σ 1345

R.A. $9^h\ 17^m\ 15^s$ Decl. + 64° 52′

1912.270	85°.2	2″.86
12.275	82.1	2.92
12.311	86.2	2.75
1912.285	84.5	2.84

1906.10	84°.4	3″.22	3n	Doo
1909.82	85.1	2.98	3n	β

[Doolittle (*Pub. Flower Obsy.* IV) . . . β (*Carnegie Inst.* 168)]

Increase in distance noted by Doolittle is not borne out by recent observations.

5071 Σ 1348. *Hydrae* 116 (7.0 . . . 7.3)

R.A. $9^h\ 18^m\ 10^s$ Decl. + 6° 52′

1908.277	322°.0	2″.09	12
08.334	322.3	1.73	12
08.400	321.8	1.84	12
13.102	320.2	2.12	
13.151	321.9	2.00	
1910.253	321.6	1.96	

Retrograde motion with increase in distance.

5075 Hd 123 (8.0 . . . 10.7)

R.A. $9^h\ 18^m\ 24^s$ Decl. − 23° 9′

A and B

1910.096	3°.4	4″.59
10.181	0.6	4.54
10.200	0.6	4.73
1910.159	1.5	4.62

Unchanged.

A and C (10.7)

1910.096	193°.2	55″.07
10.200	194.2	55.19
1910.148	193.7	55.13

No prior measures of C.

5088 A. G. 166 (9.2 ... 10.5)

R.A. $9^h\ 20^m\ 35^s$ Decl. + 1° 36′

1910.933	67°.9	3″.95
11.079	67.9	3.87
11.142	66.8	3.99
1911.051	67.5	3.94

I make the distance noticeably larger than in prior observations.

5094 Σ 1355

R.A. $9^h\ 20^m\ 59^s$ Decl. + 6° 46′

1908.277	335°.0	2″.44	12
08.334	335.0	2.55	12
08.400	333.9	2.70	12
13.102	332.5	2.76	
13.151	334.1	2.60	
1910.253	334.1	2.61	

A binary system in very slow direct motion.

5103 Σ 1356. *ω Leonis*

R.A. $9^h\ 22^m\ 2^s$ Decl. + 9° 35′

1908.277	119°.4	1″.12	12
08.334	119.7	1.05	12
08.422	118.9	0.89	12
1908.344	119.3	1.02	

A well-known binary with many recent observations.

5163 H 4224

R.A. $9^h\ 30^m\ 52^s$ Decl. − 30° 41′

1909.173	116°.1	7″.55	12
09.953	116.3	7.97	
09.958	116.0	7.97	
1909.695	116.1	7.83	

Change is doubtful.

5168 Σ 1373

R.A. $9^h\ 33^m\ 18^s$ Decl. + 77° 16′

1908.277	127°.3	2″.00	12
09.337	127.1	1.90	12
09.340	127.9	2.07	
1908.985	127.4	1.99	

Fixed.

.... SD − 11° (2732) (8.7 ... 9.2)

R.A. $9^h\ 43^m\ 52^s$ Decl. − 11° 42′

1914.290	80°.4	5″.52
14.318	80.3	5.54
1914.304	80.4	5.53

Discovered on a photographic plate.

5233 Σ 1389

R.A. $9^h\ 45^m\ 32^s$ Decl. + 27° 33′

1911.927	305°.5	2″.54
11.966	308.4	2.52
11.977	309.0	2.31
1911.957	307.6	2.46

Retrograde motion.

.... Anon. (10.9 ... 11.7)

R.A. $10^h\ 2^m\ 30^s$ Decl. + 25° 35′

1909.060	69°.8	7″.78	40
10.178	69.1	7.63	
12.185	69.9	7.32	
1910.474	69.6	7.58	

It is *nf* BD 25° (2205). Found with the 40-inch in a search for **5352** = H 477.

5337 Σ 1412 *rej.*

R.A. $10^h\ 3^m\ 29^s$ Decl. + 3° 45′

1908.966	294°.9	31″.36	40
09.044	295.2	31.14	40
09.060	293.9	31.09	40
1909.023	294.7	31.20	

Change is uncertain.

5349 OΣ 213

R.A. 10^h 6^m 22^s Decl. + 28° 1′

1909.044	99°.8	0″.89	40
10.282	110.2	0.73	
12.185	99.8	0.56	
12.415	104.5	0.61	
13.110	97.2	0.73	
1911.407	102.3	0.70	

Retrograde motion.

5351 Σ 1416

R.A. 10^h 6^m 29^s Decl. − 15° 30′

1908.296	275°.7	11″.68	12
08.304	275.5	11.78	12
08.397	276.6	11.68	12
1908.332	275.9	11.71	

Fixed.

5352 H 477

R.A. 10^h 7^m 15^s Decl. + 25° 25′

A and B

1909.060	95°.1	9″.23	40
09.112	97.1	9.50	12
09.140	95.4	9.26	12
1909.104	95.9	9.33	

Probably unchanged.

A and C (13.5)

1912.308	358°.8	14″.38
12.434	4.7	14.65
13.102	0.6	14.50
1912.461	1.4	14.51

A and D (11.3)

1909.112	333°.5	44″.15	12
12.308	333.8	43.97	
1910.710	333.6	44.06	

No other measures of the distant stars.

5354 Lewis 10 (9.3 ... 9.6)

R.A. 10^h 8^m 1^s Decl. + 18° 29′

1909.044	5°.7	1″.55	40
09.337	4.2	1.33	12
09.898	7.3	1.44	
09.909	8.1	1.47	
1909.547	6.3	1.45	

No change.

5358 Hu 459

R.A. 10^h 8^m 30^s Decl. − 17° 26′

1909.137	85°.5	1″.34	40
09.246	84.9	1.07	40
1909.142	85.2	1.20	

As yet no change.

5360 H 1176

R.A. 10^h 8^m 36^s Decl. + 58° 13′

A and B (10 ... 10)

1909.845	316°.3	9″.05
09.898	136.6	9.13
09.909	317.3	8.98
1909.884	316.7	9.05

B and C (11.8) = A 1348

1909.967	201°.5	1″.60
10.351	205.4	1.71
10.383	205.2	1.72
1910.234	204.0	1.68

5365 OΣ 215

R.A. 10^h 9^m 44^s Decl. + 18° 20′

1909.909	202°.1	1″.23
09.967	199.8	0.92
10.109	197.4	0.89
10.192	199.1	1.13
1910.044	199.6	1.04

Probably binary, though the observations deviate but little from rectilinear motion.

5376 H 3324

R.A. 10^h 11^m 19^s Decl. + 68° 44′

1910.088	197°.8	18″.94
10.203	198.3	18.97
10.211	197.5	18.73
1910.167	197.9	18.88

Recent observations make the distance somewhat larger than Dembowski's measure of 1873.

5380 H 831

R.A. 10^h 11^m 34^s Decl. − 13° 48′

1910.217	128°.3	16″.77
10.263	128.9	16.93
10.282	128.3	17.10
1910.254	128.5	16.93

No early observations.

5385 Σ 1423

R.A. 10ʰ 12ᵐ 37ˢ Decl. + 21° 10′

1910.933	55°9	1″53
11.106	55.8	1.45
11.166	54.2	1.51
1911.068	55.3	1.50

The increase in distance seems now to be arrested indicating binary motion. See measures by Bowyer, Furner, Doolittle, Doberck.

.... A 1349. BD 59° (1299) (9.6 ... 11.0)

R.A. 10ʰ 12ᵐ 49ˢ Decl. + 59° 14′

B and C

1909.826	163°4	2″48
09.909	166.1	2.88
09.967	163.5	2.91
1909.901	164.3	2.76

A and B (8.7 ... 9.6)

1909.826	192°9	27″68	
09.909	192.8	27.44	
09.967	193.0	27.35	
1909.901	192.9	27.49	
1906.86	166°2	2″58	A

[Aitken (*Bull. L. O.* 109)]

5397 Σ 1426. *Leonis* 145

R.A. 10ʰ 14ᵐ 15ˢ Decl. + 7° 2′

A and B

1911.949	286°5	0″88(a)
12.064	285.9	0.98
12.092	285.5	0.88
1912.035	286.0	0.91

(a) Objective frosted.
Direct motion.

A and C

1911.949	5°8	7″73
12.064	5.3	7.87
12.092	5.9	7.73
1912.035	5.7	7.78

No change.

5399 H 4303

R.A. 10ʰ 14ᵐ 35ˢ Decl. − 22° 0′

1910.217	266°5	8″77
10.263	266.4	8.65
10.302	265.8	9.13
10.337	266.2	8.81
1910.280	266.2	8.84

Conflicting measures. Change is doubtful.

5400 Σ 1427

R.A. 10ʰ 14ᵐ 46ˢ Decl. + 44° 31′

1908.296	214°8	9″60	12
08.304	213.9	9.50	12
08.334	213.7	9.54	12
1908.311	214.1	9.55	

Fixed.

5403 Kr 36

R.A. 10ʰ 14ᵐ 54ˢ Decl. + 62° 13′

1910.088	240°9	5″64
10.104	242.0	5.56
10.203	239.9	5.89
1910.132	240.9	5.70

The measures of distance are erratic. Change is improbable.

5421 Σ 1429

R.A. 10ʰ 18ᵐ 22ˢ Decl. + 25° 14′

1911.949	245°2	0″87
12.185	243.1	0.82
12.253	243.7	0.78
1912.129	244.0	0.82

Rectilinear motion would satisfy the relative motion, though it is probably orbital.

5426 Σ 1431

R.A. 10ʰ 19ᵐ 16ˢ Decl. + 9° 23′

1910.131	68°6	3″31
10.148	68.5	3.18
10.151	69.8	3.66
10.167	69.1	3.34
10.222	67.4	3.77
1910.164	68.7	3.45

No evidence of motion.

5434 Hu 635

R.A. $10^h\ 21^m\ 11^s$ Decl. + 48° 10′

1912.064	174°.6	4″.24
12.081	175.2	4.30
12.089	353.0	4.24
1912.078	174.3	4.26

The magnitudes are equal. Since discovery there has been no motion.

5437 OΣ 218

R.A. $10^h\ 21^m\ 18^s$ Decl. + 4° 10′

1910.192	75°.8	0″.98
10.282	74.8	0.98
10.351	74.5	0.79
1910.275	75.0	0.92

Direct motion.

5441 Σ 1438

R.A. $10^h\ 22^m\ 7^s$ Decl. + 13° 47′

1910.217	247°.4	14″.99
10.230	247.3	15.20
10.244	246.0	15.05
1910.230	246.9	15.08

Cogshall's measures of 1903 gave, 247°.8 : 14″.69. Change is doubtful.

5442 H 2532

R.A. $10^h\ 22^m\ 35^s$ Decl. + 38° 35′

A and B

1910.211	67°.7	13″.43
10.788	68.9	13.27
10.985	69.8	13.73
11.500	69.1	13.03
1910.871	68.9	13.36

1911.31 68°.4 13″.33 3n Woods

[Woods (*A. J.* 644)]

The distance is apparently increasing.

A and C

1910.211	249°.5	197″.33
10.788	249.3	197.40
1910.499	249.4	197.36

No prior measures of C.

5445 OΣ 220

R.A. $10^h\ 22^m\ 51^s$ Decl. + 10° 46′

1909.898	72°.0	1″.13(a)
10.192	68.2	1.26
10.252	63.1	1.11(a)
10.282	67.0	1.13
10.320	65.2	1.07
10.383	64.5	0.99
1910.221	66.7	1.12

(a) Seeing poor.

No evidence of motion.

5448 Σ 1439

R.A. $10^h\ 23^m\ 32^s$ Decl. + 21° 25′

1911.106	110°.8	1″.91
11.166	111.0	1.85
11.172	110.9	1.75
1911.148	110.9	1.84

Retrograde motion.

5454 H 5480 (10.1 ... 10.5)

R.A. $10^h\ 27^m\ 58^s$ Decl. + 79° 17′

1911.062	88°.9	5″.24
12.270	84.6	5.21
12.305	82.5	5.31
1911.879	85.3	5.25

If this star has been properly identified, the angle shows some increase. The components are Gr. ph. 79° (3594) and (3595). For this star Van Biesbroeck (*Ann. Observ. Belgique*, N. S. XIII) measures Gr. ph. 79° (3616).

5463 H 2533

R.A. $10^h\ 25^m\ 27^s$ Decl. + 3° 12′

1911.147	324°.5	9″.11
11.166	325.6	8.81
12.308	327.3	8.89
1911.540	325.8	8.94

It would be easy to confuse the measures of this star with those of Σ 1452 on account of the proximity and similarity.

5468 Σ 1443

R.A. 10h 26m 21s Decl. + 38° 18′

1910.211	158°.7	5″.15
10.788	157.1	5.25
10.985	158.3	5.42
11.500	159.3	5.08
1910.871	158.4	5.22

Apparently unchanged, unless perhaps the distance has increased.

5474 Σ 1447. *Leonis* 178

R.A. 10h 27m 13s Decl. + 23° 58′

1911.005	125°.9	4″.45
11.079	125.6	4.64
11.106	125.7	4.75
1911.063	125.7	4.61

Probably fixed.

5475 Σ 1444 *rej.*

R.A. 10h 27m 27s Decl. + 64° 13′

1911.062	266°.5	18″.05
12.237	266.6	17.99
12.270	266.5	17.94
1911.856	266.5	17.99

No early measures for strict comparison.

5478 Σ 1449

R.A. 10h 28m 15s Decl. + 35° 45′

1911.927	286°.3	38″.35
11.988	287.1	38.24
12.204	286.7	38.11
1912.040	286.7	38.23

Slight retrograde motion with increase in distance.

5487 Σ 1452 (9.5 ... 9.8)

R.A. 10h 29m 37s Decl. + 3° 11′

1911.109	326°.1	10″.40
11.142	326.0	10.60
11.202	327.8	10.39
1911.151	326.6	10.46

See **5463** = H 2533. No motion.

5499 A 556

R.A. 10h 31m 1s Decl. − 8° 13′

1911.941	65°.8	1″.59
12.010	66.8	1.62
12.187	65.9	1.75
1912.046	66.2	1.65

There is evidence of direct motion, unless the original angle is too small. See measures by Doolittle, Olivier, Wilson.

5524 Hd 128

R.A. 10h 35m 0s Decl. − 12° 28′

1912.010	273°.2	2″.48
12.048	272.6	2.67
12.064	272.1	2.55
1912.041	272.6	2.57

Considerable change both in angle and distance.

5527 OΣ 227

R.A. 10h 35m 22s Decl. + 11° 22′

1910.320	342°.9	0″.62
10.383	342.0	0.58
12.415	353.1	0.71
13.064	345.1	0.62
1911.546	345.8	0.63

Slow direct motion.

5528 Σ 1462 (7.8 ... 10.0)

R.A. 10h 35m 36s Decl. + 51° 26′

1912.237	174°.2	8″.40
12.270	172.9	8.47
12.275	176.6	8.38
1912.261	174.6	8.42

No evidence of motion.

5536 A 67

R.A. 10h 36m 28s Decl. − 5° 54′

1912.187	210°.7	2″.27
12.204	211.2	2.21
12.215	211.7	2.24
1912.202	211.2	2.24

Probably unchanged.

5541 H 2543

R.A. $10^h\ 37^m\ 23^s$ Decl. + 33° 7′

1910.137	32°.1	2″.91
10.178	30.0	2.73
10.184	32.5	2.78
1910.166	31.5	2.81

Fixed. Star (12.0) in 246°.3 : 16″ ±.

5556 Σ 1470

R.A. $10^h\ 40^m\ 9^s$ Decl. − 5° 8′

1912.187	8°.8	1″.47
12.308	5.9	1.33
12.352	7.5	1.44
1912.282	7.4	1.41

Apparently fixed.

5557 Σ 1472

R.A. $10^h\ 40^m\ 39^s$ Decl. + 13° 40′

1912.105	38°.0	38″.11
12.135	37.9	38.00
12.174	37.9	38.09
1912.138	37.9	38.07

Increasing distance due to proper motion.

5561 H 837

R.A. $10^h\ 41^m\ 33^s$ Decl. + 8° 11′

1912.105	343°.4	16″.43
12.135	343.9	16.64
12.174	344.1	16.52
1912.138	343.8	16.53

No early measures for comparison.

5572 Σ 1476

R.A. $10^h\ 43^m\ 12^s$ Decl. − 3° 23′

1912.951	1°.6	2″.54
13.064	3.1	2.60
13.066	2.8	2.63
1913.027	2.5	2.59

Direct motion with increase in distance.

5579 β 111 (9.0 ... 9.4)

R.A. $10^h\ 45^m\ 11^s$ Decl. − 8° 28′

A and B

1912.344	3°.1	3″.50
12.352	2.1	3.53
12.420	3.6	3.43
1912.372	3.2	3.48

Apparently unchanged. There is considerable divergence in the measures of angle.

A and C (8.8)

1912.344	128°.8	67″.03
12.951	128.5	67.09
1912.647	128.6	67.06

No prior measures of C.

5584 Ho 376

R.A. $10^h\ 46^m\ 11^s$ Decl. + 23° 50′

1912.951	218°.4	2″.92
13.064	217.6	2.89
13.066	216.8	2.97
1913.027	217.6	2.93

There may be some increase in distance. Few measures.

5591 A 132

R.A. $10^h\ 47^m\ 20^s$ Decl. − 10° 7′

1912.344	200°.1	4″.48
12.352	199.1	4.48
12.420	199.7	4.42
1912.372	199.6	4.46

No change.

5599 OΣ 230

R.A. $10^h\ 48^m\ 5^s$ Decl. + 21° 25′

1908.277	19°.7	8″.54	12
08.400	20.6	8.35	12
08.422	21.5	8.30	12
08.425	21.7	8.66	12
1908.381	20.9	8.46	

Direct motion.

5604 O. Stone 20

R.A. 10ʰ 49ᵐ 29ˢ Decl. − 26° 26′

1912.015	206°0	4″05(a)
12.048	206.3	4.08
12.064	206.7	4.04
1912.042	206.3	4.06

(a) Temperature = − 18° F.
No motion.

5637 A. G. 173

R.A. 10ʰ 54ᵐ 22ˢ Decl. + 3° 37′

1912.951	125°6	2″06
13.064	124.8	2.03
13.066	125.0	2.05
1913.027	125.1	2.05

Apparently without change.

5641 Weisse 26 (8.8 ... 9.8)

R.A. 10ʰ 54ᵐ 48ˢ Decl. + 21° 44′

1908.400	173°7	14″79	12
08.422	173.2	14.47	12
08.425	173.9	14.09	12
1908.416	173.6	14.45	

Several recent observations but no early ones.

5671 Σ 1507

R.A. 10ʰ 59ᵐ 54ˢ Decl. + 7° 41′

1910.131	162°0	8″34
10.151	163.1	8.40
10.167	162.9	8.41
1910.150	162.7	8.38

Fixed.

5683 H 839

R.A. 11ʰ 2ᵐ 1ˢ Decl. + 7° 14′

1910.109	96°0	12″36
10.151	96.2	12.48
10.167	96.1	12.17
1910.142	96.1	12.34

Fixed.

5689 H 177 (10.5 ... 11.3)

R.A. 11ʰ 3ᵐ 21ˢ Decl. − 2° 46′

1910.167	130°3	4″82
10.192	129.2	4.91
10.217	129.2	4.79
1910.192	129.6	4.84

There are no early observations.

.... SD − 15° (3215) (10.1 ... 10.2)

R.A. 11ʰ 4ᵐ 28ˢ Decl. − 15° 21′

1908.397	173°9	12″45	12
08.425	172.6	11.53	12
10.109	350.0	11.96	
10.337	170.5	12.29	
1909.317	171.7	12.06	

Found with the 12-inch.

5695 OΣ 231 *rej.*

R.A. 11ʰ 4ᵐ 30ˢ Decl. + 31° 6′

A and B

1909.309	264°1	35″43	40
09.312	264.2	35.52	40
09.337	263.9	35.59	12
1909.319	264.1	35.51	

Decrease in distance.

A and C

1909.309	336°45	163″03	40
09.312	336.32	163.58	40
09.337	336.22	163.42	12
1909.319	336.33	163.34	

Increase in distance.

C and D

1909.309	34°45	134″64	40
09.312	34.65	134.78	40
1909.310	34.55	134.71	

D was measured by β in 1908 as 34°83 : 134″43.

5700 H 494

R.A. $11^h\ 6^m\ 26^s$ Decl. + 40° 50′

1910.088	149°2	29″38
10.104	329.3	29.50
10.203	329.5	29.40
1910.132	329.3	29.43

1912.13	329°4	29″31	3n	Woods

[Woods (*A. J.* 644)]

Probably unchanged.

5705 Ho 50

R.A. $11^h\ 7^m\ 2^s$ Decl. + 41° 44′

1911.106	33°0	3″49
11.462	30.9	3.13
11.470	30.6	3.34
1911.346	31.5	3.32

Fixed.

5708 Arg. 24

R.A. $11^h\ 7^m\ 36^s$ Decl. − 15° 19′

1910.217	348°8	17″44
10.222	349.3	17.57
10.227	349.3	17.69
1910.222	349.1	17.57

Apparently fixed.

5713 Σ 1518 *rej.*

R. A. $11^h\ 8^m\ 18^s$ Decl. + 5° 55′

B and C

1910.217	349°0	3″62
10.222	349.2	3.77
10.227	349.0	3.77
1910.222	349.1	3.72

No change.

A and B

1910.217	256°8	103″81
10.222	256.5	104.07
10.227	256.8	104.07
1910.222	256.7	103.98

For AB there is only the β observation of 1901.

1901.23	256°4	103″50	2n	β

5724 Sh 372

R.A. $11^h\ 9^m\ 42^s$ Decl. − 15° 42′

1909.173	299°9	19″22	12
09.309	299.2	19.29	40
09.312	300.0	19.19	40
1909.265	299.7	19.23	

Common proper motion. Perhaps slight increase in distance.

5734. Σ 1523. ξ *Ursae Majoris*

R.A. $11^h\ 11^m\ 48^s$ Decl. + 32° 13′

1908.427	128°9	....	12
08.465	129.8	3″14	12
08.553	129.1	2.85	12
11.180	122.8	3.04	
11.462	122.4	3.26	
11.470	122.6	3.29	
11.927	118.9	3.86	(a)
11.949	122.3	3.18	
11.966	122.6	3.47	
11.977	122.8	3.31	
1908.482	129.3	2.99	3n
1911.704	122.1	3.34	7n

(a) Seeing very bad.

Many recent observations.

5747 β 791

R.A. $11^h\ 13^m\ 26^s$ Decl. + 7° 32′

1910.217	194°9	2″23
10.246	195.6	2.11
10.271	195.2	2.30
10.282	197.2	2.15
1910.254	195.7	2.20

Without motion.

5756 O. Stone 22

R.A. $11^h\ 15^m\ 27^s$ Decl. − 19° 48′

1910.274	313°5	6″26
10.280	313.2	6.26
10.282	313.4	6.07
1910.279	313.4	6.20

1909.08	313°7	5″83	3n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

The angle is perhaps increasing.

5759 Σ 3069 *rej.*

R.A. $11^{h}\ 15^{m}\ 40^{s}$ Decl. − 1° 3′

1909.967	218°.0	17″.64
09.975	218.2	17.53
10.093	218.0	17.58
1910.012	218.1	17.58

No measures prior to 1904.

5760 A. G. 174

R.A. $11^{h}\ 15^{m}\ 52^{s}$ Decl. + 65° 23′

1911.062	105°.2	2″.05
11.166	105.3	2.05
11.500	102.2	2.05
1911.243	104.2	2.05

No change.

5765 Σ 1536. *ι Leonis*

R.A. $11^{h}\ 17^{m}\ 39^{s}$ Decl. + 11° 12′

1908.427	49°.0	2″.32	12
09.060	47.5	2.28	40
09.112	50.2	2.28	12
1908.866	48.9	2.29	

The distance is now decreasing. Measures of the next few years will be of great interest.

5768 H. C. Wilson 9. SD − 9° (3269)
(9.5 ... 10.5)

R.A. $11^{h}\ 16^{m}\ 25^{s}$ Decl. − 9° 47′

1909.967	178°.0	10″.51
09.975	176.8	10.62
10.102	176.7	10.65
1910.015	177.2	10.59

Probably unchanged.

5785 Σ 1542

R.A. $11^{h}\ 21^{m}\ 25^{s}$ Decl. + 45° 14′

1909.994	263°.1	3″.01
10.184	264.2	3.15
10.203	263.9	3.56
10.211	263.2	3.64
1910.148	263.6	3.34

There may be some increase in distance.

5800 Jacob 6. *Hydrae 271*

R.A. $11^{h}\ 23^{m}\ 41^{s}$ Decl. − 23° 47′

A and B

1910.148	81°.1	8″.71
10.167	79.8	8.55
10.192	80.1	8.53
1910.169	80.3	8.60

Fixed.

A and C (8.2)

1910.148	115°.3	169″.44
10.167	115.1	168.72
10.192	115.5	169.61
1910.169	115.3	169.26

No prior measures of the distant star.

5803 β 340. BD 4° (2482)

R.A. $11^{h}\ 23^{m}\ 49^{s}$ Decl. + 3° 52′

1909.060	6°.2	4″.25	40
09.140	4.8	4.17	12
09.162	6.4	4.11	12
09.309	6.6	4.21	40
1909.168	6.0	4.18	

No change.

.... Jonckheere 85. BD 3° (2513) (8.0 ... 12.0)

R.A. $11^{h}\ 25^{m}\ 13^{s}$ Decl. + 3° 44′

1909.060	163°.1	5″.58	40
09.309	163.0	....	40
09.312	162.7	5.75	40
10.337	161.7	5.57	
1909.504	162.6	5.63	

These measures antedate the discovery by Jonckheere. Found with the 40-inch. It is *sf* **5803** = β 340.

5817 Kr 38

R.A. $11^{h}\ 26^{m}\ 5^{s}$ Decl. + 60° 40′

1911.062	49°.8	2″.91
11.150	49.8	2.80
11.166	51.7	2.83
1911.126	50.4	2.85

The angle is less in recent measures, but change is doubtful.

5835 A. G. 175

R.A. $11^h\ 28^m\ 36^s$ Decl. + 2° 10′

1909.060	182°9	2″16	40
09.173	183.3	2.13	12
09.958	182.6	2.33	
1909.397	182.9	2.21	

No change.

5849 H 4456

R.A. $11^h\ 30^m\ 47^s$ Decl. − 23° 46′

A and B

1910.217	123°7	17″39
10.246	123.6	17.50
10.263	121.4	17.91
12.204	125.0	17.15
1910.732	123.4	17.49

Marked decrease in distance.

1868.25	122°8	20″94	1n	Hd

A and C (13.2)

1910.217	326°2	39″27
10.246	328.7	39.06
10.263	329.0	40.19
1910.242	328.0	39.51

No prior measures of C.

5859 OΣ 327

R.A. $11^h\ 32^m\ 34^s$ Decl. + 41° 49′

1911.977	264°4	1″33
12.010	258.3	1.48
12.185	257.2	1.69
12.187	259.6	1.60
1912.090	259.9	1.52

The motion continues to be rectilinear. Doberck, however, gives the distance less for 1909.

1909.38	260°2	1″16	3n	Do

[Doberck (*A. N.* 4395)]

.... Roe 73. SD − 5° (3329) (9.8 ... 10.2)

R.A. $11^h\ 34^m\ 18^s$ Decl. − 5° 26′

1911.448	360°5	3″38
11.451	359.0	3.40
11.462	357.9	3.55
1911.454	359.1	3.44

Measured at Roe's request. See *A. N.* 4544.

5887 Es 123

R.A. $11^h\ 37^m\ 24^s$ Decl. + 44° 51′

A and B

1911.106	203°6	6″75
11.142	203.9	....
11.150	203.5	7.05
11.470	204.3	6.78
1911.217	203.8	6.86

No change.

A and C (9.3)

1911.106	275°2	44″31
11.142	274.8	44.56
11.150	275.2	44.30
1911.133	275.1	44.39

Comparison with prior micrometric observations indicates increase in distance. But the distance from the Astrographic Catalogue quoted by β (*Carnegie Inst.* 168) agrees well with that above.

5892 H 2583

R.A. $11^h\ 37^m\ 32^s$ Decl. + 14° 11′

1910.340	57°4	31″10
10.419	56.8	30.84
10.447	57.0	30.79
1910.402	57.1	30.91

Change is uncertain.

5897 H 4469 (9.3 ... 10.2)

R.A. $11^h\ 38^m\ 18^s$ Decl. + 15° 16′

1910.340	164°4	28″51
11.057	164.0	28.37
11.079	164.2	28.24
1910.825	164.2	28.37

No early measures.

5898 A 140

R.A. $11^h\ 38^m\ 22^s$ Decl. − 7° 25′

1910.320	136°8	2″39
11.166	140.4	2.49
11.180	138.8	2.61
1910.889	138.7	2.50

Fixed.

5901 Σ 1570

R.A. 11ʰ 39ᵐ 11ˢ Decl. + 46° 16′

1912.053	48°.0	11″.06
12.237	48.7	10.92
12.270	49.3	11.03
1912.187	48.7	11.00

Conflicting measures of distance. Fixed.

5903 H 1196 (9.5 ... 11.0)

R.A. 11ʰ 39ᵐ 25ˢ Decl. + 4° 34′

1911.057	184°.8	29″.12
11.079	184.9	28.78
11.202	185.0	29.00
1911.113	184.9	28.97

Herschel's description is:

1828 + 155° ± 20″ ± 8.9 ... 10

5908 Kr 40

R.A. 11ʰ 40ᵐ 17ˢ Decl. + 60° 30′

1911.062	275°.4	3″.29
11.150	275.1	3.46
11.166	274.6	3.26
1911.126	275.0	3.34

Without change.

5918 H 1198 (8.5 ... 12.8)

R.A. 11ʰ 41ᵐ 33ˢ Decl. + 46° 21′

1912.053	101°.7	12″.20
12.270	101.6	11.92
12.314	103.1	11.87
1912.212	102.1	12.00

No change since β, 1904.

5920 H 2586

R.A. 11ʰ 41ᵐ 45ˢ Decl. + 71° 54′

1911.062	260°.1	27″.01
11.150	259.7	26.95
11.166	259.9	27.01
1911.126	259.9	26.99

No early measures.

5931 H 2587

R.A. 11ʰ 43ᵐ 48ˢ Decl. + 71° 31′

1911.150	306°.3	19″.62
11.166	306.1	19.26
11.500	305.9	19.34
1911.272	306.1	19.41

Herschel's description is:

1830 ± 314°.7 18″ ±

Not in BD. Van Biesbroeck identifies the star as Gr. ph. 71° (5699) and measures it as follows (*Ann. Observ. Belgique*, N. S. XIII):

1908.47 307°.7 18″.84 3n Bies

5934 H 4477

R.A. 11ʰ 44ᵐ 20ˢ Decl. − 20° 10′

1912.220	108°.7	14″.83
13.099	107.7	14.88
13.173	108.4	14.71
1912.831	108.3	14.81

Herschel's description is:

1835.2 108°.3 15″ ± 8 ... 9

5946 H 511

R.A. 11ʰ 45ᵐ 52ˢ Decl. + 19° 31′

1911.109	246°.1	34″.98
11.202	245.8	35.05
11.988	246.5	35.05
1911.433	246.1	35.03

No early measures.

5970 OΣ 241

R.A. 11ʰ 50ᵐ 6ˢ Decl. + 36° 7′

1912.116	129°.9	1″.74
12.135	128.7	1.88
12.185	131.4	1.97
1912.145	130.0	1.86

Direct motion.

5978 A 561 (... 12.8)

R.A. 11ʰ 51ᵐ 41ˢ Decl. + 28° 4′

1912.308	6°.0	2″.39
12.354	9.5	2.29
12.420	10.2	2.08
1912.361	8.6	2.25

Probably unchanged.

5980 Hu 733

R.A. $11^h\ 51^m\ 50^s$ Decl. $+48^\circ\ 43'$

1912.116	162°.5	1″.97
12.185	161.1	2.00
12.229	159.9	1.87
1912.177	161.2	1.95

No motion since 1904.

5981 H 1204

R.A. $11^h\ 52^m\ 5^s$ Decl. $+4^\circ\ 14'$

1912.220	61°.5	12″.26
12.308	60.7	11.83
12.330	59.6	11.77
13.066	61.8	11.77
1912.481	60.9	11.91

If this is the Herschel star there has been considerable motion. His description is:

1828 + 125° ± 15″ ± (9–10 … 9–10)

North of BD 4° (2553).

5985 Ho 534 (8.5 … 12.5)

R.A. $11^h\ 53^m\ 18^s$ Decl. $+21^\circ\ 32'$

1912.053	137°.2	9″.97
12.185	140.1	10.14
12.204	139.9	10.02
12.354	140.1	10.06
1912.199	139.3	10.05

Apparently unchanged.

5990 OΣ 242 *rej.*

R.A. $11^h\ 53^m\ 51^s$ Decl. $+71^\circ\ 20'$

A and C

1911.062	332°.2	33″.24
11.150	152.1	33.15
11.500	152.3	32.91
1911.237	152.2	33.10

Probably unchanged.

C and D (12.8)

1911.500	113°.4	6″.02
13.064	112.7	5.98
1912.282	113.0	6.00

Another star near C. No change.

A and B (12.2) = β 795

1911.500	326°.1	14″.01
13.064	331.5	14.47
1912.282	328.8	14.24

No change.

5991 Hu 734

R.A. $11^h\ 53^m\ 57^s$ Decl. $-12^\circ\ 32'$

1912.105	187°.1	3″.61(a)
12.108	187.6	3.64(b)
12.135	188.6	3.71
1912.116	187.8	3.65

(a) Temperature = − 5° F. (b) − 11° F.
Fixed.

6000 Hu 132

R.A. $11^h\ 54^m\ 41^s$ Decl. $-11^\circ\ 29'$

1912.108	67°.8	1″.66
12.275	64.5	1.41
12.297	65.4	1.47
1912.227	65.9	1.51

Possibly some change in angle.

6004 Σ 1590

R.A. $11^h\ 55^m\ 28^s$ Decl. $+71^\circ\ 31'$

1911.150	236°.7	5″.58
11.500	234.2	5.40
12.270	233.0	5.45
1911.640	234.6	5.48

No change.

6006 Σ 1588

R.A. $11^h\ 56^m\ 6^s$ Decl. $+73^\circ\ 2'$

1912.270	50°.0	14″.16
12.275	51.3	14.05
12.305	51.5	14.17
1912.283	50.9	14.13

Retrograde motion.

6020 Σ 1597 *rej.*

R.A. $11^h\ 58^m\ 45^s$ Decl. $+9^\circ\ 50'$

1912.105	143°.5	30″.76
12.135	143.4	30.90
12.204	144.0	30.72
1912.148	143.6	30.79

Fixed.

6030 Σ 1601

R.A. $12^h\ 0^m\ 2^s$ Decl. + 39° 30′

1909.994	307°.5	2″.40
10.170	308.5	2.20
10.181	310.7	2.21
1910.115	308.9	2.27

Slow retrograde motion.

6031 A 76

R.A. $12^h\ 0^m\ 11^s$ Decl. + 71° 3′

A and C

1911.062	42°.1	22″.59
11.150	221.6	22.29
11.166	222.4	22.60
11.500	222.6	22.26
1911.220	222.2	22.34

Increase in distance.

A and B

1911.166	340°.2	1″.34
11.500	342.2	1.41
13.064	345.6	1.38
1911.910	342.7	1.38

No change.

6034 Ho 255

R.A. $12^h\ 0^m\ 48^s$ Decl. + 21° 10′

1910.359	132°.4	2″.27
11.166	135.5	....
12.015	130.0	2.78
12.053	126.6	2.52
12.185	132.7	2.69
1911.556	131.4	2.56

Fixed.

6046 Σ 1604

R.A. $12^h\ 3^m\ 15^s$ Decl. − 11° 11′

A and B

1908.296	91°.4	10″.56	12
08.304	91.2	10.84	12
08.397	91.5	10.90	12
1908.332	91.4	10.77	

Slight relative motion.

A and C

1908.296	89°.2	33″.44	12
08.304	89.9	34.22	12
08.397	89.7	33.96	12
1908.332	89.6	33.87	

Decrease in angle and distance due to proper motion.

.... Es 725. BD 47° (1933) (9.2 ... 9.7)

R.A. $12^h\ 4^m\ 4^s$ Decl. + 47° 15′

1910.211	56°.8	6″.77
11.911	56.1	6.84
11.927	56.6	6.66
1911.350	56.5	6.76

1909.34	58°.4	6″.83	2n	Es

[Espin (*M. N.* LXIX, 604)]

6058 S 634

R.A. $12^h\ 5^m\ 14^s$ Decl. − 16° 7′

1910.195	282°.9	6″.68
10.208	284.3	6.46
10.217	285.1	6.43
1910.207	284.1	6.52

Slow direct motion.

6064 Σ 1608

R.A. $12^h\ 5^m\ 31^s$ Decl. + 54° 6′

1908.427	221°.9	12″.17	12
09.140	42.1	12.14	12
09.162	222.3	12.04	12
1908.910	222.1	12.12	

The distance is increasing.

6066 H 4506

R.A. $12^h\ 5^m\ 32^s$ Decl. − 23° 18′

1910.148	333°.4	4″.91
10.181	331.7	4.72
10.189	332.2	4.75
1910.173	332.4	4.79

Retrograde motion with perhaps increase in distance.

6073 H 2602

R.A. 12^{h} 6^{m} 20^{s} Decl. + 46° 58′

1910.211	224°.6	23″.37
11.911	226.8	23.60
11.927	226.4	23.28
1911.350	225.9	23.42

The star is 19^{s} *f* and 18′ *s* of BD 47° (1935). Probably unchanged.

6080 Hu 570

R.A. 12^{h} 7^{m} 42^{s} Decl. + 21° 58′

1910.340	108°.5	2″.34
12.053	106.5	2.54
12.185	104.7	2.55
1911.526	106.6	2.48

The measures are somewhat discordant but there is no motion.

6087 H 204

R.A. 12^{h} 8^{m} 51^{s} Decl. − 0° 42′

1910.195	55°.7	36″.65
10.208	55.4	35.90
10.217	55.2	35.99
1910.207	55.4	36.18

Probably unchanged.

6097 Σ 1621

R.A. 12^{h} 9^{m} 54^{s} Decl. + 6° 19′

1910.217	139°.8	2″.42
10.236	138.8	2.40
10.246	139.9	2.23
1910.233	139.5	2.35

Direct motion with decrease in distance.

6139 Howe 26

R.A. 12^{h} 15^{m} 19^{s} Decl. − 23° 33′

1910.151	146°.3	5″.48
10.181	145.4	5.31
10.189	146.2	5.45
1910.174	146.0	5.41

No change. The magnitudes are equal.

6160 A. G. 177 (9.0 ... 10.0)

R.A. 12^{h} 18^{m} 35^{s} Decl. + 3° 5′

A and B

1909.312	219°.1	7″.72	40
09.337	218.0	7.39	12(a)
09.340	217.7	7.67	12
09.425	218.4	7.82	40
1909.354	218.3	7.65	

(a) B very faint. Haze and full moon.
Marked increase in distance.

A and C (11.2)

1909.312	53°.4	97″.33	40
09.425	53.5	96.99	40
1909.368	53.4	97.16	

No prior measures of C.

6164 O. Stone 23

R.A. 12^{h} 19^{m} 22^{s} Decl. − 27° 45′

1910.274	312°.7	18″.37
10.280	312.1	17.59
10.359	312.6	18.24
1910.304	312.5	18.07

If the star has been correctly identified there is decided increase in distance.

.... BD 8° (2602) (7.9 ... 9.2)

R.A. 12^{h} 21^{m} 9^{s} Decl. + 7° 54′

1913.378	322°.5	52″.31
13.422	323.1	52.28
14.375	322.5	52.38
1913.725	322.7	52.32

South of **6175** = Σ 1644.

6205 H 212

R.A. 12^{h} 27^{m} 24^{s} Decl. + 10° 51′

1910.236	263°.9	21″.98
10.246	264.1	21.90
10.249	263.8	21.93
1910.244	263.9	21.94

Probably fixed.

6210 Ho 537

R.A. $12^h\ 28^m\ 31^s$ Decl. + 34° 50′

1912.053	175°.2	1″.53
12.108	172.7	1.56
12.135	173.4	1.71(a)
1912.099	173.8	1.60

(a) Difficult. Poor seeing.

The angle is smaller than in the original measures of 1896 and the distance is markedly larger.

6214 H 1218

R.A. $12^h\ 29^m\ 28^s$ Decl. − 16° 10′

1910.252	.....	11″.90
19.255	258°.9	11.62
10.263	259.9	11.72
10.271	258.4	11.32
1910.260	259.1	11.64

Change is uncertain.

6216 Σ 1661

R.A. $12^h\ 29^m\ 57^s$ Decl. + 12° 4′

1910.109	237°.9	2″.36
10.145	234.4	2.40
10.167	234.3	2.40
1910.140	235.5	2.39

1907.25	239°.6	2″.54	2n	Lau
1909.38	239.6	2.57	3n	Do
1909.41	241.4	2.31	2n	Furner
1912.44	241.5	2.43	1n	Furner

[Lau (*A. N.* 4193) . . . Doberck (*A. N.* 4395) . . . Furner (*Greenwich Obsns.* 1909; *M. N.* LXXIV, 137)]

The angle is certainly increasing. My measure is apparently low.

6226 H 1219 (10.2 ... 10.3)

R.A. $12^h\ 32^m\ 14^s$ Decl. + 45° 24′

1911.911	76°.7	10″.66
11.988	76.4	10.24
12.053	256.4	10.33
1911.984	76.5	10.41

Probably unchanged. The magnitudes are nearly equal.

6232 H 1220

R.A. $12^h\ 33^m\ 0^s$ Decl. − 0° 53′

1910.249	51°.4	7″.12
10.255	50.6	7.05
10.282	51.1	7.09
1910.262	51.0	7.09

No early measures for comparison.

6237 Ḩ 2617

R.A. $12^h\ 34^m\ 51^s$ Decl. + 40° 57′

A and B

1909.967	4°.2	5″.51
10.211	6.9	5.59
10.236	6.7	5.61
1910.138	5.9	5.57

The measures are discordant.

A and C (9.2)

1910.211	175°.2	165″.26
10.236	175.1	165.05
1910.223	175.1	165.15

No prior measures of C.

6241 H 2619 (8.4 ... 10.8)

R.A. $12^h\ 35^m\ 25^s$ Decl. + 75° 5′

1912.270	266°.1	24″.01
12.275	266.5	24.11
12.305	266.6	24.16
1912.283	266.4	24.09

1912.48	265°.8	24″.07	3n	Woods

[Woods (*A. J.* 644)]

Color contrast: A, Yellow; B, blue.

No early measures for comparison. Van Biesbroeck notes the identity of this star with **6255**, H 1221. (*Ann. Observ. Belgique*, N. S. XIII).

6243 Σ 1670. *γ Virginis*

R.A. $12^h\ 35^m\ 37^s$ Decl. − 0° 47′

1910.217	326°.1	6″.68
10.227	325.0	7.39(a)
10.230	324.3	6.47
10.249	326.7	6.22
10.255	323.9	6.29
12.223	325.8	6.00
12.237	324.0	6.10
12.272	322.4	6.38(a)
12.275	325.2	6.13
12.297	325.3	6.07
1910.236	325.2	6.61
1912.261	324.5	6.14

(a) Seeing very poor.

Well-known binary.

6267 OΣ 255 *rej.*

R.A. 12h 40m 8s Decl. + 3° 7′

1910.337	339°.8	18″.98
10.419	339.0	19.00
11.079	339.5	19.14
1910.612	339.4	19.04

Diminishing distance with increase in angle.

6272 A. G. 182

R.A. 12h 42m 16s Decl. + 34° 59′

1910.236	189°.8	2″.39
10.263	188.8	2.40
10.269	186.7	2.51
1910.256	188.4	2.43

Probably unchanged.

6273 Hu 135

R.A. 12h 42m 47s Decl. − 12° 58′

1910.320	348°.7	3″.38
10.337	349.3	3.41
10.433	348.0	3.19
1910.363	348.7	3.33

Unchanged.

6283 Σ 1717

R.A. 12h 45m : Decl. + 89° 20′

1912.270	332°.4	8″.04
12.275	329.0	8.15
12.305	329.4	8.27
1912.283	330.3	8.15

Retrograde motion.

6293 H 2621 (9.0 … 10.5)

R.A. 12h 46m 25s Decl. + 7° 52′

A and B

1910.337	189°.7	28″.09
10.340	190.6	28.39
10.468	189.3	28.06
1910.382	189.9	28.18

A and C (9.1)

1910.337	264°.4	34″.95
10.340	264.7	35.04
10.468	265.4	35.07
1910.382	264.8	35.02

In β G. C. the angle of A and C is given as 270°, corresponding to the above. This is certainly not the system measured later by β (*Carnegie Inst.* 168).

1907.13	85°.0	34″.90	2n	A and B
1907.13	128.7	38.18	2n	A and C

6296 Σ 1687. 35 *Comae*

R.A. 12h 47m 23s Decl. + 21° 54′

A and B

1910.320	91°.2	1″.22
10.351	91.7	1.17
10.378	89.6	1.35
1910.350	90.8	1.25

Colors yellow and bluish. Direct motion.

A and C

1910.320	125°.4	28″.86
10.378	125.0	28.98
1910.349	125.2	28.92

No change.

6310 H 850 (10 … 10.3)

R.A. 12h 49m 55s Decl. + 8° 51′

1910.337	171°.6	11″.93(a)
10.340	171.2	11.68
10.433	170.7	11.83
1910.370	171.2	11.81

(a) N. G. C. 4791, 4795 + 4796, and 4803 were seen nearby. The preceding member of the double nebula 4795 + 4796 is the brighter.

No early measures for comparison.

6312 OΣ 256

R.A. 12h 50m 17s Decl. − 0° 18′

1910.383	253°.3	0″.64
11.172	256.6	0.76
11.949	264.0	0.67
12.092	79.7	0.76
12.237	77.0	0.64
1911.567	78.1	0.69

Direct motion. Several recent observations.

6318 Σ 1695. *Ursae Majoris* 417

R.A. $12^h\ 51^m\ 3^s$ Decl. + 54° 45′

1911.109	285°.3	3″.78
11.150	285.7	4.23
11.448	284.8	3.52
11.517	282.0	3.70
11.522	280.9	3.59
11.525	281.9	4.11
1911.379	283.4	3.82

Perhaps slow retrograde motion.

6320 A 146 (... 10.5)

R.A. $12^h\ 51^m\ 13^s$ Decl. − 9° 6′

1910.320	305°.2	1″.91(a)
11.144	304.1	2.17(b)
11.202	300.5	2.02(b)
12.092	306.9	2.12
1911.190	304.2	2.06

(a) Very thick. (b) Seeing poor.
No change.

6322 H 2624

R.A. $12^h\ 51^m\ 20^s$ Decl. − 16° 30′

1911.109	225°.4	25″.98
11.144	225.2	25.91
11.185	225.8	25.73
1911.146	225.5	25.87

No early measures.

6329 Σ 1699

R.A. $12^h\ 52^m\ 54^s$ Decl. + 28° 8′

1912.010	1°.6	1″.66
12.053	2.1	1.54
12.064	182.0	1.62
1912.042	1.9	1.61

Fixed.

6333 Σ 1703

R.A. $12^h\ 53^m\ 7^s$ Decl. + 8° 33′

1912.220	277°.8	16″.13
12.327	277.8	15.85
12.330	277.5	15.92
1912.292	277.7	15.97

Proper motion.

6335 H 2628 (8.5 ... 10.0)

R.A. $12^h\ 53^m\ 21^s$ Decl. + 59° 1′

1912.346	29°.9	31″.94
12.420	30.6	31.83
12.434	30.3	31.80
1912.400	30.3	31.86

No early observations.

6347 Σ 1707

R.A. $12^h\ 55^m\ 17^s$ Decl. + 16° 31′

1912.135	34°.3	9″.42
12.187	34.9	9.29
12.204	34.5	9.38
1912.175	34.6	9.36

Fixed.

6351 Barnard 6

R.A. $12^h\ 56^m\ 31^s$ Decl. + 16° 12′

1912.135	41°.9	2″.86
12.187	40.2	2.92
12.204	40.1	3.01
1912.175	40.7	2.93

Apparently fixed.

6356 Hu 137

R.A. $12^h\ 56^m\ 47^s$ Decl. − 11° 31′

1912.135	301°.7	3″.75
12.187	121.8	3.84
12.204	302.2	3.72
1912.175	301.9	3.77

Discovered in 1900. No change since the original measures.

6358 Σ 1711

R.A. $12^h\ 56^m\ 54^s$ Decl. + 14° 7′

1912.185	343°.7	0″.97
12.237	343.4	0.87
12.308	345.7	0.96
1912.243	344.3	0.93

Probably decrease in both angle and distance.

6364 Kr 41 (8.9 . . . 9.8)

R.A. $12^{h}\ 57^{m}\ 32^{s}$ Decl. $+ 57^{\circ}\ 4'$

1912.270	338°.4	3″.75
12.275	338.9	3.67
12.305	333.7	3.72
1912.283	337.0	3.71

Fixed.

6381 Ho 257 = Ku 44

R.A. $13^{h}\ 0^{m}\ 4^{s}$ Decl. $+ 26^{\circ}\ 52'$

1912.062	154°.0	2″.08
12.064	154.2	2.00
12.081	156.8	2.00
1912.069	155.0	2.03

1903.30	158°.0	1″.77	3n	Doo
1903.31	154.9	1.80	2n	A
1904.40	155.2	2.24	3n	Bowyer
1906.30	154.6	1.75	2n	Bowyer
1910.46	153.7	2.11	2n	Lewis

[Doolittle (*Pub. Flower Obsy.* III) . . . Aitken (*Pub. L. O.* XII) . . . Bowyer (*Greenwich Obsns.* 1904; 1906) . . . Lewis (*M. N.* LXXI, 728)]

Without motion.

6391 Comstock

R.A. $13^{h}\ 1^{m}\ 24^{s}$ Decl. $- 17^{\circ}\ 21'$

1910.102	176°.4	3″.13
10.167	177.7	3.66(a)
10.181	177.9	3.53
1910.150	177.3	3.44

(a) Fog. Very faint.

There may be some slight decrease in angle.

6398 Σ 1722. *Comae* 179

R.A. $13^{h}\ 2^{m}\ 30^{s}$ Decl. $+ 16^{\circ}\ 8'$

1908.422	337°.3	3″.36	12
08.425	337.6	3.32	12
08.465	336.9	3.32	12
1908.437	337.3	3.33	

No marked change. The angle may be less than in the earlier measures.

6403 H 2644

R.A. $13^{h}\ 3^{m}\ 12^{s}$ Decl. $+ 76^{\circ}\ 56'$

1912.270	253°.1	38″.94
12.305	253.6	39.07
12.314	253.1	38.96
1912.296	253.3	38.99

No early observations.

6415 OΣ 261

R.A. $13^{h}\ 6^{m}\ 23^{s}$ Decl. $+ 32^{\circ}\ 43'$

1908.422	343°.9	1″.79	12
08.465	343.2	1.80	12
08.485	343.7	1.54	12
1908.457	343.6	1.71	

Increase in distance apparently arrested.

13243 A 684

R.A. $13^{h}\ 6^{m}\ 46^{s}$ Decl. $- 1^{\circ}\ 19'$

1912.308	15°.9	1″.53
13.288	19.1	1.68
13.291	21.1	1.47
13.444	17.1	1.59
1913.083	18.3	1.57

Aitken's description is:

1904.42	16°.0	1″.28	2n

6438 Σ 1733. ♅ II 46 (8.4 . . . 8.8)

R.A. $13^{h}\ 10^{m}\ 27^{s}$ Decl. $+ 17^{\circ}\ 53'$

1912.187	127°.8	5″.06
12.204	127.6	5.00
12.275	127.4	5.06
1912.222	127.6	5.04

No material change.

6441 A. G. 186

R.A. $13^{h}\ 10^{m}\ 47^{s}$ Decl. $+ 2^{\circ}\ 49'$

1910.167	307°.8	3″.81
10.181	307.5	3.74
10.184	307.9	3.61
1910.177	307.7	3.72

Probably unchanged.

6442 β 800. *Comae* 201

R.A. $13^{h}\ 10^{m}\ 52^{s}$ Decl. $+ 17^{\circ}\ 40'$

1912.135	113°.6	3″.80
12.187	113.6	3.98
12.204	113.6	3.80
1912.175	113.6	3.86

Very slow change in angle but decided increase in distance. Aitken gives in *Pub. L. O.* XII:

1911.44	111°.2	3″.53	2n

13245 Hu 1146

R.A. 13^h 11^m 57^s Decl. + 37° 27′

1912.308	39°.4	3″.90
12.354	39.2	4.04
12.420	39.2	4.02
1912.361	39.3	3.99

No change.

6453 H 223. BD 16° (2493)

R.A. 13^h 14^m 17^s Decl. + 16° 12′

1912.220	348°.7	36″.42
12.420	348.7	36.09
12.434	348.7	36.28
1912.358	348.7	36.26

No early measures.

.... BD 16° (2497) (9.2 ... 9.4)

R.A. 13^h 15^m 47^s Decl. + 16° 19′

1912.220	86°.8	17″.33
12.420	86.1	17.10
12.434	86.6	16.98
1912.358	86.5	17.14

This is *nf* **6453** = H 223.

6471 Σ 1739 *rej.*

R.A. 13^h 16^m 57^s Decl. + 31° 9′

1910.211	129°.9	13″.40(a)
10.263	130.0	13.37
10.269	129.8	13.50
1910.248	129.9	13.42

(a) Very faint. Clouds.
Change is uncertain.

6490 β 237

R.A. 13^h 20^m 59^s Decl. + 15° 0′

1908.422	203°.8	3″.25	12
08.425	206.3	3.03	12
08.465	202.5	2.97	12
1908.437	204.2	3.08	

Relatively fixed.

6500 β 113

R.A. 13^h 23^m 10^s Decl. + 12° 6′

1912.108	213°.9	1″.50(a)
12.116	211.4	1.56
12.135	213.7	1.57
1912.120	213.0	1.54

(a) Temperature = − 10° F.
Direct motion.

6501 Ho 381. R *Hydrae.*

R.A. 13^h 23^m 10^s Decl. − 22° 39′

1910.263	323°.6	21″.99
10.271	321.3	21.38
10.280	321.4	21.36
10.340	323.7	21.53
11.144	324.8	21.77
1910.460	323.0	21.61

The measures of distance are discordant. Probably no change.

6506 H 2655. SD − 22° (3607)

R.A. 13^h 24^m 7^s Decl. − 22° 50′

1910.280	273°.2	14″.42
10.340	274.3	14.28
11.144	273.9	14.22
1910.588	273.8	14.31

No early measures.

..... BD 15° (2590) (9.2 ... 12.5)

R.A. 13^h 26^m 35^s Decl. + 15° 5′

1908.465	28°.6	12″.42	12
08.553	30.8	12.19	12
10.200	24.4	11.68	
12.229	26.0	12.58	
1909.862	27.4	12.22	

The faint companion was detected with the 12-inch.

6530 Σ 1757

R.A. 13^h 28^m 9^s Decl. + 0° 18′

1909.967	81°.6	2″.88(a)
10.046	81.7	2.76
10.102	82.7	2.63
1910.038	82.0	2.76

(a) Temperature = − 2° F.
Direct motion. Many recent measures.

6546 S 651

R.A. $13^{h}\ 30^{m}\ 9^{s}$ Decl. $-25°\ 53'$

1910.222	189°.4	10″.45
10.227	188.7	10.51
10.230	189.4	10.30
10.236	190.0	10.71
1910.229	189.4	10.49

Probably unchanged.

6551 Σ 1767

R.A. $13^{h}\ 30^{m}\ 39^{s}$ Decl. $+68°\ 22'$

1908.425	350°.5	4″.62	12
08.479	349.3	4.62	12
08.485	349.0	4.31	12
1908.463	349.6	4.52	

Apparently fixed.

6560 Σ 1764

R.A. $13^{h}\ 31^{m}\ 38^{s}$ Decl. $+3°\ 0'$

1909.271	30°.6	16″.17	40
09.312	30.9	16.02	40
09.331	31.2	15.93	40
1909.305	30.9	16.04	

Entirely fixed.

A of **6560** to A of **6563**

1909.312	138°.84	172″.01	40
09.331	138.75	172.41	40
1909.321	138.8	172.21	

No prior measures.

6563 Σ 1765 *rej.*

R.A. $13^{h}\ 31^{m}\ 46^{s}$ Decl. $+2°\ 58'$

1909.271	163°.2	39″.43	40
09.312	163.5	39.12	40
09.331	163.4	39.21	40
1909.305	163.4	39.25	

Entirely fixed.

6566 Σ 1768. 25 *Canum Venaticorum*

R.A. $13^{h}\ 32^{m}\ 7^{s}$ Decl. $+36°\ 54'$

1908.422	124°.6	0″.98	12
08.485	128.2	1.26	12
08.518	129.9	1.22	12
08.553	130.8	1.27	12
1908.494	128.4	1.18	

Well-known binary. Measures of the next few years will be of great interest.

6568 H 3341

R.A. $13^{h}\ 32^{m}\ 14^{s}$ Decl. $+28°\ 56''$

1911.988	193°.0	2″.45
12.015	192.5	2.52
12.108	191.1	2.58
1912.037	192.2	2.52

The distance is increasing.

6577 Σ 1771

R.A. $13^{h}\ 33^{m}\ 32^{s}$ Decl. $+70°\ 23'$

1908.553	73°.4	1″.95	12
09.140	252.0	2.00	12
09.162	73.3	1.70	12
1908.952	72.9	1.88	

Without motion.

6607 Σ 3081

R.A. $13^{h}\ 38^{m}\ 46^{s}$ Decl. $-11°\ 14'$

1910.046	68°.3	2″.05
10.102	68.1	1.99
10.131	67.6	1.93
1910.093	68.0	1.99

Motionless.

6611 S 652

R.A. $13^{h}\ 38^{m}\ 59^{s}$ Decl. $-9°\ 55'$

A and B

1910.046	134°.2	49″.00
10.195	133.0	49.00
10.208	134.2	48.69
1910.150	133.8	48.90

Apparently considerable motion.

A and C (9.5)

1910.195	339°.7	113″.64
10.208	339.7	113.51
1910.202	339.7	113.57

β measured this distant star (*Carnegie Inst.* 168):

1908.26	339°.9	114″.01

6614 Winnecke 5

R.A. $13^h\ 39^m\ 20^s$ Decl. $-\ 2°\ 25'$

1909.271	160°.2	4″.06	40
09.312	339.9	4.12	40
09.331	159.5	4.05	40
1909.305	159.9	4.08	

Change is doubtful.

6634 Σ 1784

R.A. $13^h\ 41^m\ 22^s$ Decl. $+\ 69°\ 49'$

1908.485	205°.9	8″.88
08.553	206.0	8.94
08.630	204.5	9.32(a)
1908.556	205.5	9.05

(a) Very thick, B faint.

Schroeter in *A. N.* 4259 gives a correction to the R.A. of β G. C. No significant motion.

6641 Σ 1785 = Sh 168

R.A. $13^h\ 43^m\ 38^s$ Decl. $+\ 27°\ 35'$

1911.949	325°.4	1″.37
12.010	325.9	1.57
12.015	326.1	1.57(a)
1911.911	325.8	1.50

(a) Temperature = − 19° F.

Well-known binary with rapid motion. Many recent observations.

6642 β 802

R.A. $13^h\ 43^m\ 48^s$ Decl. $+\ 48°\ 57'$

1911.079	219°.2	3″.65
11.109	218.7	3.74
11.150	219.6	3.77
1911.113	219.2	3.72

Immobile.

6651 H 2689

R.A. $13^h\ 45^m\ 11^s$ Decl. $+\ 58°\ 44'$

1912.270	311°.8	26″.07
12.305	310.6	26.34
12.314	311.6	26.25
1912.296	311.3	26.22

No early measures.

6658 A 568

R.A. $13^h\ 46^m\ 55^s$ Decl. $+\ 26°\ 20'$

1911.185	320°.2	2″.75
11.517	321.3	2.52
11.533	320.5	2.66
1911.412	320.7	2.64

These measures indicate increase in distance.

6660 H 2690

R.A. $13^h\ 47^m\ 14^s$ Decl. $+\ 5°\ 49'$

1910.337	102°.0	27″.14
10.340	101.4	26.71
10.359	101.2	26.58
10.433	101.0	26.90
1910.367	101.4	26.83

No early measures for comparison.

6661 Skinner 7 = Ku 46

R.A. $13^h\ 47^m\ 41^s$ Decl. $-\ 14°\ 32'$

1910.302	111°.1	2″.58
10.359	111.5	2.43
10.433	111.6	2.39
1910.365	111.4	2.47

1900.28	294°.6	2″.44	2n	Skinner
1906.94	114.6	2.16	3n	Doo

[Skinner (*Wash. Obsns.* II, Vol. VI) . . . Doolittle (*Pub. Flower Obsy.* IV)]

No indication of motion.

6668 Σ 1788

R.A. $13^h\ 48^m\ 41^s$ Decl. $-\ 7°\ 28'$

1910.302	79°.9	3″.40
10.320	79.7	2.98
10.326	80.2	3.21
1910.316	79.9	3.20

Direct motion. Many recent measures.

6671 OΣ 272

R.A. 13^{h} 49^{m} 1^{s} Decl. + 30° 30′

1912.010	12°.7	1″.97
12.062	14.8	1.91
12.092	11.9	1.94
1912.055	13.1	1.94

Retrograde motion.

6690 β 30

R.A. 13^{h} 52^{m} 26^{s} Decl. + 20° 3′

1912.135	197°.0	8″.12
12.187	197.9	8.00
12.267	196.8	8.19
1912.196	197.2	8.10

Immobile.

6698 H 2696

R.A. 13^{h} 54^{m} 53^{s} Decl. − 13° 34′

1912.220	108°.4	17″.30(a)
12.434	107.1	17.39
13.244	107.4	17.36(b)
1912.633	107.6	17.35

(a) Difficult, seeing very poor. (b) B very faint. No early measures.

6699 Σ 1796

R.A. 13^{h} 55^{m} 16^{s} Decl. + 37° 33′

1911.988	194°.3	2″.64
12.010	193.5	2.67
12.062	193.1	2.57
1912.020	193.6	2.63

Fixed.

6700 Σ 1798

R.A. 13^{h} 55^{m} 17^{s} Decl. + 78° 59′

1911.172	12°.1	7″.52
11.415	12.1	7.56
11.448	11.7	7.61
1911.345	12.0	7.56

Fixed.

6709 A. G. 192. A. G. Alb. 4860

R.A. 13^{h} 57^{m} 39^{s} Decl. + 3° 17′

1912.092	5°.7	3″.01
12.103	4.0	3.19
12.116	4.6	3.07
1912.104	4.8	3.09

1880.4	190°	3″.5		A. G. Alb.
1902.75	186.8	1.82	3n	Cg
1908.36	186.5	1.18	1n	Furner
1911.17	7.2	2.19	2n	Doolittle
1911.44	8.2	3.09	1n	Furner

Cogshall's observation is given in β G. C. The other references are:

[Furner (*Greenwich Obsns.* 1908) . . . Doolittle (*Pub. Flower Obsy.* IV) . . . Furner (*M. N.* LXXIII, 93)]

Either the measures are exceedingly erratic with reversal of angle, or there is decided relative motion. Taking the measures at face value they yield for the proper motion:

0″.186 in 188°.6.

6712 Σ 1800 *rej.*

R.A. 13^{h} 57^{m} 57^{s} Decl. + 57° 48′

1912.270	20°.0	28″.15
12.305	19.6	27.84
12.314	20.2	27.90
1912.296	19.9	27.96

No early observations.

6724 OΣ 274

R.A. 14^{h} 1^{m} 31^{s} Decl. + 35° 21′

1909.173	243°.7	13″.67	12
09.312	65.1	13.81	40
09.340	65.3	13.51	12
1909.275	64.7	13.66	

Retrograde motion with decrease in distance.

6725 Σ 1802

R.A. 14^{h} 1^{m} 35^{s} Decl. − 12° 21′

1908.304	283°.4	5″.72	12
08.373	281.6	5.44	40
08.389	280.9	5.54	12
1908.355	282.0	5.57	

Increase in distance.

6731 OΣ 276

R.A. $14^{h}\ 3^{m}\ 6^{s}$ Decl. + 37° 19′

A and B

1908.373	199°.6	0″.63	40
08.389	196.3	0.55	12
08.444	196.7	0.53	12
1908.402	197.5	0.57	

Apparently unchanged.

A and C

1908.373	73°.3	9″.62	40
08.389	71.5	9.38	12
08.444	71.6	9.71	12
1908.402	72.1	9.57	

Apparently motionless.

6732 OΣ 275

R.A. $14^{h}\ 3^{m}\ 14^{s}$ Decl. + 7° 57′

1909.271	351°.6	5″.03	40
09.312	352.0	5.15	40
09.406	352.3	4.95	40
09.425	350.9	5.04	40
1909.354	351.7	5.04	

Fixed.

13260 A 1098

R.A. $14^{h}\ 4^{m}\ 25^{s}$ Decl. + 9° 1′

1912.308	234°.7	4″.79
12.319	234.0	4.70
12.327	234.7	4.82
1912.318	234.5	4.77

As yet no motion.

6762 Σ 1813

R.A. $14^{h}\ 7^{m}\ 24^{s}$ Decl. + 5° 58′

1909.406	190°.8	4″.96	40
09.425	191.4	4.92	40
09.515	191.4	4.99	12
1909.449	191.2	4.96	

Entirely fixed.

6773 Σ 1817. *Boötis* 107

R.A. $14^{h}\ 8^{m}\ 49^{s}$ Decl. + 27° 15′

1912.092	359°.7	1″.17
12.116	357.7	1.19
12.187	357.8	1.15
1912.132	358.4	1.17

Slow retrograde motion with decrease in distance.

6778 Σ 1821. *κ Boötis*

R.A. $14^{h}\ 9^{m}\ 11^{s}$ Decl. + 52° 21′

1908.422	236°.6	13″.20	12
08.425	236.4	13.03	12
08.455	237.1	13.14	12
1908.434	236.7	13.12	

Increase in distance is questionable.

6784 H 1248

R.A. $14^{h}\ 9^{m}\ 58^{s}$ Decl. + 7° 54′

1909.312	162°.7	7″.72	40
09.425	161.6	7.72	40
1909.368	162.1	7.72	

No motion since β's measures of 1901.

6785 Σ 1824

R.A. $14^{h}\ 10^{m}\ 21^{s}$ Decl. + 6° 38′

1909.515	281°.1	5″.14	12
09.518	280.6	5.24	12
1909.516	280.8	5.19	

Without motion.

6790 Howe 31

R.A. $14^{h}\ 10^{m}\ 39^{s}$ Decl. − 27° 16′

1910.227	73°.4	6″.34
10.246	73.4	6.10
10.255	73.5	5.97
10.271	73.4	6.20
1910.250	73.4	6.15

Unaltered.

6798 Howe 33

R.A. 14ʰ 11ᵐ 18ˢ Decl. − 26° 58′

1910.249	118°.3	3″.38
10.255	119.1	3.29
10.271	117.7	3.38
1910.258	118.4	3.35

No change.

..... SD − 15° (3847) (9.1 ... 10.9)

R.A. 14ʰ 12ᵐ 37ˢ Decl. − 16° 1′

1908.400	138°.8	6″.33	12
08.416	136.9	6.22	12
08.455	138.9	5.91	12
10.167	137.3	6.31	
1908.860	138.0	6.19	

Found with the 12-inch.

6812 β 1271

R.A. 14ʰ 13ᵐ 4ˢ Decl. + 55° 6′

1912.305	347°.6	3″.06
12.354	346.7	2.86
12.519	349.6	2.60(a)
1912.393	348.0	2.84

(a) Very faint.

The measures are somewhat discordant. No motion unless perhaps the angle has decreased.

6819 H 1252

R.A. 14ʰ 14ᵐ 22ˢ Decl. + 8° 50′

1910.222	268°.4	12″.20
10.246	269.0	12.02
10.282	268.6	12.08
1910.250	268.7	12.10

Unchanged.

6820 OΣ 281

R.A. 14ʰ 14ᵐ 26ˢ Decl. + 9° 8′

1910.217	158°.4	1″.48
10.246	157.2	1.59
10.282	157.7	1.42
1910.248	157.8	1.50

Fixed.

..... SD − 15° (3858) (9.1 ... 10.9)

R.A. 14ʰ 15ᵐ 0ˢ Decl. − 15° 42′

1908.400	184°.1	19″.51	12
08.416	182.3	19.91	12
08.422	182.9	20.11	12
08.425	182.3	20.08	12
1908.416	182.9	19.90	

Found with the 12-inch.

6831 H 2711 (9.5 ... 12.1)

R.A. 14ʰ 15ᵐ 53ˢ Decl. − 22° 32′

1910.102	129°.9	13″.80(a)
10.131	129.9	13.77
10.181	129.8	13.95
1910.138	129.9	13.84

(a) B very faint.

Without motion.

6837 Σ 1833

R.A. 14ʰ 16ᵐ 18ˢ Decl. − 7° 13′

1909.406	167°.7	5″.54	40
09.425	166.8	5.71	40
09.515	168.2	5.47	12
1909.449	167.6	5.57	

There is probably some increase in the distance. Lau gives (*A. N.* 4193):

1907.31	169°.2	5″.59

13269 A 1103

R.A. 14ʰ 17ᵐ 1ˢ Decl. + 10° 18′

1912.135	202°.4	4″.85
12.187	201.8	4.73
12.237	201.6	4.82
1912.186	201.9	4.80

Without motion.

6840 H 2714

R.A. 14ʰ 17ᵐ 18ˢ Decl. − 19° 50′

1910.222	275°.1	24″.63		
10.246	278.2	24.41		
10.263	276.9	24.60		
10.282	277.3	24.49		
1910.253	276.9	24.53		
1910.79	279°.5	24″.56	2n	β

[β (*Carnegie Inst.* 168)]

These measures together with those given in β G. C., II give for the proper motion:

0″.123 in 110°.3.

6842 A and BC = Σ 1835

R.A. 14ʰ 17ᵐ 29ˢ Decl. + 9° 0′

1910.217	188°8	6″50
10.222	186.3	6.81
10.246	187.8	6.71
10.282	188.5	6.59
1910.242	187.8	6.65

Unchanged.

..... SD − 15° (3863) (9.4 ... 10.9)

R.A. 14ʰ 17ᵐ 56ˢ Decl. − 15° 35′

1908.400	226°4	24″81	12
08.425	227.2	25.08	12
08.455	226.1	25.23	12
1908.427	226.6	25.04	

6849 Σ 1844

R.A. 14ʰ 18ᵐ 9ˢ Decl. + 77° 21′

1910.266	209°8	1″91
10.531	211.7	1.91
11.415	214.0	1.74
11.517	213.8	1.71
1910.932	212.3	1.82

Without change.

6857 β 225 = Sh 179 = ♅N 80

R.A. 14ʰ 18ᵐ 48ˢ Decl. − 19° 26′

A and B

1910.222	295°7	35″20
10.246	295.2	35.38
10.282	295.6	34.93
1910.250	295.5	35.17

Immobile.

B and C = β 225 = Hd 138

1910.246	98°7	1″54(a)
10.282	98.7	1.31
1910.264	98.7	1.42

(a) Seeing very poor.
No certain evidence of motion.

6862 H 4679

R.A. 14ʰ 19ᵐ 10ˢ Decl. − 21° 35′

1910.222	305°8	16″67
10.227	304.5	16.65
10.246	305.7	16.83
1910.232	305.3	16.72

1911.41	307°0	16″64	3n	Doo
1911.74	306.4	16.33	3n	Woods

[Doolittle (*Pub. Flower Obsy.* IV) . . . Woods (*A. J.* 644)]

The measures are erratic.

Change is uncertain though indications point to increase in distance.

6863 Cordoba

R.A. 14ʰ 19ᵐ 28ˢ Decl. − 23° 40′

1910.246	131°7	2″45
10.249	130.8	2.30
10.271	129.3	2.30
1910.255	130.6	2.35

No motion.

6872 Σ 1849

R.A. 14ʰ 20ᵐ 18ˢ Decl. + 77° 15′

1910.266	0°1	1″34
11.415	0.4	1.37
11.517	2.5	1.28
1911.066	1.0	1.33

Entirely fixed.

13271 Hu 1150

R.A. 14ʰ 20ᵐ 25ˢ Decl. + 61° 36′

1912.305	260°5	1″31
12.354	257.5	1.50
12.519	255.7	1.48(a)
1912.393	257.9	1.43

(a) Clouds. Very faint.
Fixed.

..... SD − 16° (3869) (9.5 ... 11.5)

R.A. 14ʰ 20ᵐ 40ˢ Decl. − 16° 7′

1908.400	8°6	13″90	12
08.455	7.2	14.77	12
08.465	5.7	14.46	12
1908.440	7.2	14.38	

6877 Ho 386

R.A. $14^h\ 21^m\ 34^s$ Decl. $-22°\ 28'$

1910.102	322°.9	4″.51
10.131	321.7	4.29(a)
10.181	323.3	4.38
1910.138	322.6	4.39

(a) Seeing very poor.

These measures indicate increase in distance. Further observations are needed.

6880 Σ 1846. *φ Virginis*

R.A. $14^h\ 22^m\ 2^s$ Decl. $-1°\ 41'$

1910.148	110°.2	5″.12
10.167	109.8	5.05
10.181	109.4	5.02
1910.165	109.8	5.06

The distance is slowly increasing. β adds another star (12.8), (*Carnegie Inst.* 168):

1911.20	208°.8	95″.11	3n	β

6894 Σ 1887

R.A. $14^h\ 24^m\ 9^s$ Decl. $+87°\ 58'$

1910.274	236°.0	3″.28
10.531	231.0	3.49
11.500	233.2	3.40
1910.768	233.4	3.39

There may be slight decrease in angle.

6912 β 238

R.A. $14^h\ 27^m\ 1^s$ Decl. $-20°\ 30'$

1910.148	89°.9	7″.66
10.167	89.4	7.17
10.181	89.7	7.12
10.184	90.0	7.48
1910.170	89.8	7.36

Probably unchanged.

6927 A. G. Clark 6

R.A. $14^h\ 28^m\ 45^s$ Decl. $+30°\ 21'$

1912.116	136°.7	0″.73
12.229	140.5	0.82
12.308	140.1	0.74
1912.218	139.1	0.76

Without motion since the date of discovery, 1877.

6936 Σ 3087

R.A. $14^h\ 30^m\ 42^s$ Decl. $+19°\ 56'$

1910.184	44°.0	2″.11
10.200	41.1	2.03(a)
10.208	42.7	2.02
1910.197	42.6	2.05

(a) Seeing very good.

No certain evidence of motion.

6963 OΣ 284

R.A. $14^h\ 36^m\ 6^s$ Decl. $+49°\ 13'$

1908.465	100°.9	7″.14	12
08.479	101.3	7.78	12
08.518	101.1	7.14	12
1908.487	101.1	7.35	

Unchanged.

6972 Hu 575

R.A. $14^h\ 37^m\ 5^s$ Decl. $+20°\ 1'$

1912.308	129°.1	0″.42
12.478	130.4	0.43
12.483	125.3	0.36
1912.423	128.3	0.40

1905.41	152°.5	0″.69	1n	Lewis
1907.22	163.9	0.63	2n	Doo
1908.50	135.9	0.70	2n	Bowyer
1909.44	147.3	0.48	2n	Bowyer

[Lewis (*Greenwich Obsns.* 1905) . . . Doolittle (*Pub. Flower Obsy.* IV) . . . Bowyer (*Greenwich Obsns.* 1908; 1909)]

Marked retrograde motion with decrease in distance.

..... SD − 15° (3940) (9.4 ... 10.5)

R.A. $14^h\ 37^m\ 18^s$ Decl. $-15°\ 22'$

1908.455	218°.6	27″.79	12
10.167	218.5	27.82	
1909.311	218.6	27.81	

6975 Σ 1871

R.A. $14^h\ 37^m\ 27^s$ Decl. $+51°\ 54'$

1910.326	292°.1	1″.96
10.351	292.4	2.02
10.531	291.8	2.17
1910.403	292.1	2.05

Probably slow direct motion.

6979 H 5487

R.A. $14^{h}\ 37^{m}\ 52^{s}$ Decl. + 29° 18′

1911.109	232°.2	20″.36
11.150	232.4	20.43
11.185	232.2	20.51
1911.148	232.3	20.43

Doolittle's measures of 1908 are in good agreement with the above. No earlier measures.

6984 H 2746

R.A. $14^{h}\ 38^{m}\ 48^{s}$ Decl. + 70° 15′

1912.105	239°.8	22″.51
12.270	239.8	22.62
12.305	240.8	22.47
1912.227	240.1	22.53

No early measures.

6985 Σ 1875

R.A. $14^{h}\ 38^{m}\ 51^{s}$ Decl. + 38° 15′

1910.326	127°.2	3″.21
10.351	124.9	3.09
10.531	126.2	3.28
1910.403	126.1	3.19

Without change.

6986 H 2743

R.A. $14^{h}\ 38^{m}\ 52^{s}$ Decl. + 6° 13′

1910.326	25°.3	24″.65
10.337	25.4	24.87
10.340	25.6	25.15
1910.334	25.4	24.89

No early measures.

6989 Sh 184

R.A. $14^{h}\ 39^{m}\ 4^{s}$ Decl. − 24° 56′

1910.326	128°.8	9″.08
10.359	128.8	9.07
10.378	129.2	9.44
10.430	129.9	9.04
1910.373	129.2	9.16

No relative motion. Common proper motion.

6993 Σ 1877. *ε Boötis*

R.A. $14^{h}\ 39^{m}\ 45^{s}$ Decl. + 27° 35′

1910.351	329°.4	3″.04
10.383	329.4	2.98
10.403	328.9	3.49(a)
10.452	330.3	3.01(a)
10.473	329.3	3.40
1910.412	329.5	3.18

(a) Seeing very poor.

Little if any change. Many recent measures.

6997 Σ 1876

R.A. $14^{h}\ 40^{m}\ 2^{s}$ Decl. − 6° 53′

1910.353	76°.4	1″.10
10.359	79.4	1.34
10.383	78.3	1.25
1910.365	78.0	1.23

Direct motion.

6999 Σ 1879

R.A. $14^{h}\ 40^{m}\ 23^{s}$ Decl. + 10° 10′

1910.383	124°.9	0″.64(a)
10.449	123.7	0.65
10.452	124.4	0.61
1910.428	124.3	0.63

(a) Superb seeing.

An interesting binary. Van Biesbroeck has an extended series of observations of this pair. (*Ann. Observ. Belgique*, N. S. XIII.)

7002 Σ 1881

R.A. $14^{h}\ 40^{m}\ 59^{s}$ Decl. + 1° 29′

1908.334	357°.7	3″.57	12
08.444	356.0	3.71	12
08.455	358.0	3.83	12
1908.411	357.2	3.70	

No change.

7006 β 346. *Librae* 23

R.A. $14^{h}\ 41^{m}\ 50^{s}$ Decl. − 16° 50′

1910.326	252°.8	1″.66
10.359	251.1	1.72
12.308	255.2	1.74
1910.998	253.0	1.71

Direct motion with increase in distance.

7007 Hu 477

R.A. $14^h\ 42^m\ 18^s$ Decl. − 16° 30′

1910.326	29°.9	4″.59
10.359	211.5	4.81
10.378	30.9	4.82
1910.354	30.8	4.74

Without change.

7011 H 241

R A. $14^h\ 42^m\ 46^s$ Decl. + 12° 34′

1910.460	140°.9	18″.16
10.463	141.9	18.30
10.468	141.8	18.18
1910.464	141.5	18.21

No early measures.

7013 Σ 1883

R.A. $14^h\ 42^m\ 56^s$ Decl. + 6° 27′

1910.449	229°.4	0″.45
12.229	46.1	0.40
12.415	232.2	0.42
1911.698	229.2	0.42

An interesting pair.

7016 Ho 546 (8.6 ... 11.3)

R.A. $14^h\ 43^m\ 43^s$ Decl. − 6° 40′

1910.353	91°.6	3″.34
10.359	91.5	3.25
10.408	93.4	3.46
1910.373	92.2	3.35

The distance is larger here than in prior measures.

13283 A 1111

R.A. $14^h\ 43^m\ 59^s$ Decl. + 10° 48′

1912.187	295°.1	2″.83
12.237	295.1	3.13(a)
12.272	293.9	3.03
1912.232	294.7	3.00

(a) Very faint. Thick.
Probably without change.

7034 Σ 1888. ξ *Boötis*

R.A. $14^h\ 45^m\ 51^s$ Decl. + 19° 36′

1910.465	141°.8	2″.48
10.473	143.6	2.54
10.482	141.7	2.69
10.487	139.7	2.60
10.493	142.5	2.48
1910.480	141.9	2.56

Well-known binary. Many recent measures.

13285 Hu 1153

R.A. $14^h\ 46^m\ 0^s$ Decl. + 15° 48′

1912.187	280°.7	4″.42
12.308	281.7	4.27
12.319	280.6	4.27
1912.271	281.0	4.32

Immobile.

7038 Ho 389

R.A. $14^h\ 46^m\ 39^s$ Decl. + 20° 47′

1912.010	93°.9	1″.83
12.064	98.7	1.87
12.092	100.3	1.85
12.116	99.7	1.65
1912.070	98.1	1.80

I make the distance larger than do prior observers.

7043 H 2752 (7.3 ... 8.8)

R.A. $14^h\ 47^m\ 4^s$ Decl. + 45° 6′

1911.109	122°.4	6″.16
11.424	122.3	6.31
11.448	122.7	6.23
1911.327	122.5	6.23

Possibly some change.

7044 OΣ 287

R.A. $14^h\ 47^m\ 8^s$ Decl. + 45° 25′

1911.448	322°.8	0″.87
11.506	324.4	0.91
11.517	325.0	0.91
1911.490	324.1	0.90

The motion is still apparently rectilinear.

7049 ΟΣ 288

R.A. 14ʰ 47ᵐ 46ˢ Decl. + 16° 12′

1908.334	185°.9	1″.74	12
08.373	188.1	1.94	40
08.416	185.4	1.85	12
10.449	184.3	1.69	
10.452	186.1	1.75	
10.455	184.1	1.65	
1908.374	186.5	1.84	
1910.452	184.8	1.70	

The increase in distance seems to be arrested.

7062 H 560. BD 35° (2628) (9.2 ... 10.6)

R.A. 14ʰ 50ᵐ 45ˢ Decl. + 35° 27′

1911.424	299°.8	37″.80
11.528	299.4	37.40
11.533	299.2	37.17
1911.495	299.5	37.46

No early measures.

7066 Σ 1893

R.A. 14ʰ 51ᵐ 10ˢ Decl. + 29° 58′

1911.424	236°.7	19″.80
11.467	237.1	19.62
11.528	237.0	19.75
1911.473	236.9	19.72

Retrograde motion with decreasing distance.

7083 H 1263

R.A. 14ʰ 53ᵐ 17ˢ Decl. + 7° 17′

A and C (10.2 ... 11.2)

1912.103	105°.1	17″.33
12.105	104.8	17.14
12.272	104.0	17.11
1912.160	104.6	17.19

Herschel's description is:

1828 + 102° ± 15″ ± 10 ... 10 +

A and B (13.5)

1913.261	66°.6	15″.60
13.346	66.9	15.48
14.460	65.5	15.11
1913.689	66.3	15.40

This faint closer companion was detected with the 18½-inch.

7092 H 1265 (11.2 ... 11.5)

R.A. 14ʰ 55ᵐ 7ˢ Decl. + 6° 50′

1911.465	270°.5	10″.20
11.489	270.4	10.17
11.533	90.8	9.94
1911.496	270.6	10.10

This star is 12ˢ *p* and 1′ *n* of BD 6° (2972). No early measures for comparison.

7093 H 1266. BD 4° (2948) (9.7 ... 10.0)

R.A. 14ʰ 55ᵐ 19ˢ Decl. + 4° 44′

1911.424	24°.3	13″.99
11.465	24.9	13.18
11.489	24.2	13.24
11.528	25.7	13.10
1911.476	24.8	13.38

No early measures.

7095 Σ 1899

R.A. 14ʰ 55ᵐ 20ˢ Decl. − 2° 41′

1911.424	67°.3	28″.31
11.465	66.7	28.49
11.467	67.3	28.36
1911.452	67.1	28.39

Unaltered.

7096 β 348. 2 *Serpentis*

R.A. 14ʰ 55ᵐ 40ˢ Decl. + 0° 20′

1908.444	115°.2	0″.61	12
08.553	117.8	0.52	12
08.613	113.6	0.48	12
1908.537	115.5	0.54	

Without motion.

7098 Σ 1901. *Boötis* 342

R.A. 14ʰ 55ᵐ 59ˢ Decl. + 31° 51′

1911.467	.....	25″.32
11.517	197°.3	25.26
11.528	197.3	25.26
1911.504	197.3	25.28

Change from proper motion. Given by β as 0″.079 in 231°.8.

13291 Hu 1155

R.A. $14^h\ 56^m\ 13^s$ Decl. $+15°\ 35'$

1912.135	15°.1	4″.17(a)
12.187	12.6	3.90
12.237	13.5	3.95
1912.186	13.7	4.01

(a) Clouds. Very faint.
As yet there is no change.

13292 Hu 1156

R.A. $14^h\ 56^m\ 23^s$ Decl. $+14°\ 31'$

1912.187	295°.3	4″.01
12.308	294.8	3.92
12.319	295.7	3.96
1912.271	295.3	3.96

Without motion.

7113 H 2761 (8.9 ... 9.4)

R.A. $14^h\ 59^m\ 2^s$ Decl. $+29°\ 50'$

1911.988	168°.9	34″.27
12.105	168.8	34.27
12.272	168.9	34.21
1912.122	168.9	34.25

No early observations. Herschel's description is:

1830 +	169°.6	20″ ±

7117 β 119

R.A. $14^h\ 59^m\ 10^s$ Decl. $-6°\ 33'$

1911.467	298°.1	1″.71
11.506	298.7	1.65
11.539	300.0	1.71
1911.504	298.9	1.69

Retrograde motion.

7119 Σ 1907

R.A. $14^h\ 59^m\ 48^s$ Decl. $+12°\ 6'$

1910.184	358°.0	1″.11
10.200	359.9	1.07
10.246	362.1	1.08
1910.210	360.0	1.09

1906.02	7°.0	1″.21	3n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

I make the angle less than previous observers.

7120 Σ 1909. 44 *Boötis*

R.A. $14^h\ 59^m\ 51^s$ Decl. $+48°\ 7'$

1908.304	242°.7	4″.53	12
08.389	244.0	4.43	12
08.416	242.3	4.30	12
11.426	244.0	4.23	
11.467	244.1	4.05	
11.500	240.0	4.36	
1908.370	243.0	4.42	
1911.464	242.7	4.21	

Well-known binary. Many recent observations.

13293 Hu 1157

R.A. $15^h\ 0^m\ 6^s$ Decl. $-17°\ 38'$

1912.439	244°.7	2″.97
12.472	248.8	2.64
12.511	65.8	2.85
1912.474	246.4	2.82

The magnitudes are equal and the quadrant uncertain.

7124 H 2762

R.A. $15^h\ 0^m\ 38^s$ Decl. $+6°\ 37'$

1912.105	247°.9	10″.71
12.108	68.4	10.85
12.272	65.8	11.12
1912.162	67.4	10.89

Woods (*A. J.* 644) retains the original quadrant.

7127 Σ 1910

R.A. $15^h\ 1^m\ 46^s$ Decl. $+9°\ 41'$

1908.304	211°.6	4″.69	12
08.334	210.6	4.35	12
08.373	209.6	4.49	40
1908.337	210.6	4.51	

Entirely fixed.

7128 Σ 1911

R.A. $15^h\ 1^m\ 57^s$ Decl. $+12°\ 26'$

1910.167	292°.8	2″.05
10.184	293.0	2.29
10.200	292.5	2.11
1910.184	292.8	2.15

No change.

13296 A 1114

R.A. 15ʰ 2ᵐ 59ˢ Decl. + 59° 9′

1912.305	287°.8	1″.13
12.354	284.1	1.21
12.390	289.2	1.11
1912.350	287.0	1.15

Apparently fixed.

13297 A 1115

R.A. 15ʰ 3ᵐ 46ˢ Decl. +33′ 73°

1912.346	144°.3	2″.26
12.354	321.5	2.29
12.390	147.1	2.30
12.483	141.9	2.21
1912.393	143.7	2.27

Probably unchanged.

7144 H 2768

R.A. 15ʰ 4ᵐ 37ˢ Decl. + 45° 36′

1911.988	115°.5	21″.44
12.105	115.8	21.28
12.272	116.2	21.55
1912.122	115.8	21.42

Precedes BD 45° (2261). No early observations.

7148 A 572

R.A. 15ʰ 5ᵐ 17ˢ Decl. + 42° 10′

1911.988	8°.4	4″.21
12.064	7.6	4.26
12.272	4.8	4.23
1912.108	6.9	4.23

Probably unchanged.

7153 Σ 1918

R.A. 15ʰ 5ᵐ 34ˢ Decl. + 63° 36′

1908.304	20°.9	18″.11	12
08.389	21.2	18.01	12
08.416	20.2	17.95	12
1908.370	20.8	18.02	

No measures prior to 1905.

7161 H C. Wilson 13. SD − 4° (3838)

R.A. 15ʰ 8ᵐ 29ˢ Decl. − 4° 12′

1909.406	288°.4	5″.08	40
09.502	287.0	4.97	40
09.515	286.5	4.83	12
1909.474	287.3	4.96	

Without change.

7162 Σ 1919

R.A. 15ʰ 7ᵐ 24ˢ Decl. + 19° 43′

1911.988	10°.5	24″.34
12.010	9.6	24.34
12.064	9.9	24.43
1912.021	10.0	24.37

The distance is probably slightly less than in the earliest measures.

7163 H 250. BD 36° (2579) (9.2 ... 11.5)

R.A. 15ʰ 7ᵐ 40ˢ Decl. + 36° 50′

1911.988	125°.5	22″.35
12.420	126.5	22.48
12.502	126.5	22.29
1912.303	126.2	22.37

No early observations. Herschel's description is:

1820 + 125° ± 20″ ±

7164 Sh 195. *Librae* 97

R.A. 15ʰ 7ᵐ 42ˢ Decl. − 17° 59′

1912.439	140°.0	47″.12
12.472	140.0	47.15
12.480	140.0	47.25
1912.464	140.0	47.17

Change is uncertain. The distance may be slowly decreasing.

7170 H 1270

R.A. 15ʰ 8ᵐ 8ˢ Decl. + 7° 17′

1910.148	159°.0	14″.74
10.200	159.1	14.48
10.208	159.4	14.63
1910.185	159.2	14.62

Possibly the distance is slowly increasing.

7173 A 15

R.A. $15^{h}\ 8^{m}\ 27^{s}$ Decl. $-4°\ 12'$

1912.308	288°.7	5″.08
12.319	288.8	5.06
12.349	289.3	5.09
1912.325	288.9	5.08

As yet no motion. Star (14.0) in 87° : 21″.

7191 Σ 1926

R.A. $15^{h}\ 10^{m}\ 23^{s}$ Decl. $+38°\ 45'$

1912.415	255°.1	0″.99
12.478	253.1	1.00
12.480	248.7	1.09
12.483	252.4	0.99
1912.464	252.3	1.02

Perhaps slow decrease in distance.

7192 OΣ 295

R.A. $15^{h}\ 10^{m}\ 25^{s}$ Decl. $+37°\ 17'$

1912.415	128°.4	0″.81(a)
12.478	130.3	0.91
12.480	129.6	1.00
12.483	131.6	0.88
1912.464	130.0	0.90

(a) Very faint. Clouds.
No certain evidence of change.

7193 Σ 1925

R.A. $15^{h}\ 10^{m}\ 28^{s}$ Decl. $-7°\ 50'$

1912.064	11°.0	5″.33
12.081	11.7	5.31
12.092	11.4	5.27
1912.079	11.4	5.30

Perhaps slight increase in distance. Common, large proper motion.

7201 β 227

R.A. $15^{h}\ 12^{m}\ 7^{s}$ Decl. $-23°\ 50'$

1910.217	172°.0	2″.37
10.266	173.0	2.29
10.383	172.8	2.15
1910.289	172.6	2.27

The angle appears to be slowly diminishing.

7202 OΣ (App) 137

R.A. $15^{h}\ 12^{m}\ 11^{s}$ Decl. $+51°\ 23'$

1909.271	105°.55	73″.61	40
09.312	105.62	73.59	40
09.340	105.62	73.59	12
1909.308	105.60	73.60	

The distance is decreasing.

7206 H 5492

R.A. $15^{h}\ 12^{m}\ 36^{s}$ Decl. $+14°\ 38'$

1912.103	257°.3	12″.48
12.105	258.7	12.39
12.272	257.5	12.44
1912.160	257.8	12.44

1909.35	257°.7	11″.90	2n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

No early measures.

7208 β 228

R.A. $15^{h}\ 12^{m}\ 38^{s}$ Decl. $-23°\ 50'$

1910.266	314°.9	0″.91
10.383	314.9	0.82
10.449	315.2	0.85
1910.366	315.0	0.86

Retrograde motion.

7212 Σ 1934

R.A. $15^{h}\ 13^{m}\ 10^{s}$ Decl. $+44°\ 14'$

A and B

1909.271	25°.7	7″.11	40
09.312	27.4	7.07	40
09.340	25.9	7.25	12
1909.308	26.3	7.14	

Motion apparently rectilinear.

A and C (9.0)

1909.312	217°.74	141″.13	40
09.340	217.55	141.38	12
1909.326	217.65	141.25	

1911.23	217°.77	140″.65	3n	β

[β (*Carnegie Inst.* 168)]

7214 Σ 1932. *Coronae* 1

R.A. $15^h\ 13^m\ 12^s$ Decl. + 27° 16′

1912.185	352°.8	0″.67
12.229	349.6	0.65
12.478	350.6	0.62
12.480	356.7	0.71
1912.343	352.4	0.66

Strong relative motion. Several recent measures.

7218 β 353

R.A. $15^h\ 13^m\ 55^s$ Decl. + 85° 57′

1910.274	297°.7	3″.46
10.531	.....	3.49
11.109	297.7	3.50
11.150	296.4	3.55
1910.766	297.3	3.50

Entirely fixed. Star (12.5) in 263° : 20″.

7232 Hu 307

R.A. $15^h\ 15^m\ 55^s$ Decl. − 16° 29′

1912.092	180°.5	2″.97(a)
12.103	359.7	3.15(b)
12.105	360.4	3.19(c)
1912.100	360.2	3.10

(a) Temperature = − 10° F. (b) − 3° F. (c) − 8° F.

Unaltered.

7237 Σ 3093

R.A. $15^h\ 16^m\ 27^s$ Decl. − 1° 6′

1909.406	142°.0	28″.62	40
09.502	142.3	28.61	40
09.515	142.0	28.60	12
1909.475	142.1	28.61	

Proper motion given by β (*Carnegie Inst.* 168) as: 0″.076 in 105°.0.

7242 Comstock

R.A. $15^h\ 17^m\ 18^s$ Decl. − 25° 20′

1912.349	13°.2	6″.26
12.420	11.9	6.34
12.511	13.9	6.31
1912.427	13.0	6.30

No evidence of motion.

7251 Σ 1937. η *Coronae*

R.A. $15^h\ 18^m\ 15^s$ Decl. + 30° 43′

1911.437	40°.7	1″.05
11.506	36.9	1.10
11.517	36.2	1.03
11.533	38.1	1.01
11.533	36.7	1.02
12.229	40.8	1.07
1911.626	38.2	1.05

There are many recent observations of this well-known binary.

7255 Hu 148

R.A. $15^h\ 19^m\ 20^s$ Decl. + 55° 42′

1912.305	198°.5	1″.53
12.354	198.3	1.60
12.390	194.3	1.36(a)
1912.350	197.0	1.50

(a) Difficult.

Without motion.

7259 Σ 1938. μ^2 *Boötis*

R.A. $15^h\ 20^m\ 0^s$ Decl. + 37° 46′

1912.185	53°.5	1″.42
12.229	53.4	1.22
12.237	57.4	1.27
1912.217	54.8	1.30

Well-known binary. Many recent observations.

13307 A 1119

R.A. $15^h\ 20^m\ 35^s$ Decl. + 8° 47′

1912.272	182°.1	1″.66
12.297	183.4	1.62
12.308	182.2	1.60
1912.292	182.6	1.63

Probably unchanged. I reverse the angle.

.... A 1632. BD 46° (2064) (9.3 ... 10.0)

R.A. $15^h\ 21^m\ 16^s$ Decl. + 46° 33′

1914.085	51°.1	1″.94
14.090	50.8	2.03
14.104	53.2	1.94
1914.093	51.7	1.97

Aitken's description (*Bull. L. O.* 125) is:

1907.55	51°.4	1″.68	2n	A

7273 Σ 1944

R.A. $15^h\ 21^m\ 47^s$ Decl. + 6° 31′

1910.167	322°7	1″05
10.181	325.5	1.44
10.184	323.4	1.28
1910.177	323.9	1.26

Retrograde motion.

7276 OΣ 296

R.A. $15^h\ 22^m\ 18^s$ Decl. + 44° 26′

1908.422	299°0	1″73	12
08.455	305.1	1.94	12
08.479	298.2	1.68	12
08.518	300.5	1.71	12
11.988	300.9	2.09	
12.116	304.1	1.77	
12.185	301.0	1.87	
1910.023	301.3	1.83	

Retrograde motion.

7282 Hu 150

R.A. $15^h\ 23^m\ 25^s$ Decl. + 21° 3′

1909.406	24°0	4″45	40
09.518	23.7	4.63	12
1909.462	23.8	4.54	

Apparently fixed.

7288 Σ 3125

R.A. $15^h\ 24^m\ 17^s$ Decl. + 67° 29′

1911.150	268°6	2″33
11.415	268.5	2.21
11.500	264.3	2.14
1911.355	267.1	2.23

No significant change.

.... Roe 2. BD 46° (2073) (9.4 ... 9.8)

R.A. $15^h\ 26^m\ 9^s$ Decl. + 46° 43′

1912.062	79°3	4″64		
12.064	80.4	4.54		
12.081	81.4	4.48		
1912.069	80.4	4.55		
1909.663	77°7	3″97	3n	Roe

[Roe (*A. N.* 4381)]

7317 Σ 1956

R.A. $15^h\ 29^m\ 2^s$ Decl. + 42° 13′

1909.271	35°0	1″81	40
09.312	40.1	1.88	40
09.367	41.9	1.85	40
1909.317	39.0	1.85	

The distance is slowly diminishing.

7328 Ho 63

R.A. $15^h\ 30^m\ 46^s$ Decl. + 28° 47′

1910.266	303°3	1″51
10.531	306.4	1.51
11.437	302.2	1.35
11.451	306.0	1.51
1910.921	304.5	1.47

Without motion.

7332 OΣ 298

R.A. $15^h\ 31^m\ 46^s$ Decl. + 40° 12′

1910.266	189°8	1″41
10.320	187.7	1.25
10.351	190.0	1.38
1910.312	189.2	1.35

A binary of short period. Many recent measures.

13318 A 1124

R.A. $15^h\ 33^m\ 7^s$ Decl. + 55° 55′

1912.305	130°6	1″08
12.354	131.0	1.14
12.390	138.4	1.10
12.480	132.9	1.06
1912.382	133.2	1.09

As yet no motion.

7358 β 354

R.A. $15^h\ 36^m\ 0^s$ Decl. − 25° 2′

1910.148	285°6	5″85(a)
10.200	286.6	5.68
10.246	287.2	5.76
1910.198	286.5	5.76

(a) Temperature = − 6° F.

Possibly slight increase in distance.

13322 A 1125

R.A. 15ʰ 36ᵐ 53ˢ Decl. + 5° 32′

1912.297	284°.1	1″.34
12.349	279.9	1.32
12.366	282.0	1.28
1912.337	282.0	1.31

Interval since discovery too short to reveal motion.

7381 Pritchett = Ku 51

R.A. 15ʰ 40ᵐ 12ˢ Decl. + 35° 59′

1912.064	226°.5	4″.70
12.081	225.7	4.63
12.092	225.8	4.57(a)
1912.079	226.0	4.63

(a) Temperature = − 13° F.

1906.37	43°.4	4″.49	3n	Morgan
1908.61	228.2	5.32	1n	Lewis
1911.19	224.3	4.58	2n	Doo

[Morgan (*A. J.* 593) . . . Lewis (*Greenwich Obsns.* 1908) . . . Doolittle (*Pub. Flower Obsy.* IV)]

In the original observation of 1881 the distance was less. Change doubtful.

7382 Σ 1980

R.A. 15ʰ 40ᵐ 22ˢ Decl. + 81° 27′

1910.269	50°.2	10″.48
10.274	50.7	10.46
10.531	50.9	10.14
1910.358	50.6	10.36

No material change.

7410 Skinner 9

R.A. 15ʰ 45ᵐ 32ˢ Decl. − 16° 52′

1910.266	274°.1	2″.23
10.282	274.4	2.32
10.326	275.1	1.78
10.340	274.9	2.23
1910.304	274.6	2.14

Star (12.0) in 290° : 37″.4. Also faint star 22″ *p*. Unchanged.

13326 A 1128

R.A. 15ʰ 46ᵐ 13ˢ Decl. + 5° 52′

1912.297	343°.6	1″.56
12.308	343.7	1.60
12.319	345.3	1.53
1912.308	344.2	1.56

Without motion.

7418 β 36. 2 *Scorpii*

R.A. 15ʰ 46ᵐ 24ˢ Decl. − 24° 58′

1910.181	272°.8	2″.97
10.200	270.8	2.85
10.246	273.8	3.00
1910.209	272.5	2.94

No significant motion.

7422 Σ 1983

R.A. 15ʰ 47ᵐ 27ˢ Decl. + 35° 49′

1912.346	71°.4	15″.83
12.420	71.9	15.86
12.426	72.1	15.97
1912.397	71.8	15.89

Change due to proper motion. Given by β (*Carnegie Inst.* 168) as: 0″.027 in 117°.1.

13329 A 1130

R.A. 15ʰ 48ᵐ 21ˢ Decl. + 5° 50′

1912.297	330°.4	2″.05
12.308	333.7	2.05
12.319	331.2	1.99
1912.308	331.8	2.03

As yet no motion.

7429½ A. G. 199

R.A. 15ʰ 48ᵐ 47ˢ Decl. + 52° 55′

1911.150	[illegible]	[illegible]
11.500	251.7	9.48
11.517	252.0	9.54
1911.389	252.1	9.54

First measured in 1900. No change.

7433 Σ 1985

R.A. 15ʰ 49ᵐ 42ˢ Decl. − 1° 49′

1910.337	334°.9	5″.88
10.340	155.4	6.10
10.367	335.4	5.97
1910.348	335.2	[illegible]

Slow direct motion.

13332 A 1133

R.A. $15^h\ 50^m\ 34^s$ Decl. $+ 69^\circ\ 4'$

1912.305	49°.9	1″.28
12.354	230.1	1.33
12.390	228.6	1.25
1912.350	229.5	1.29

The magnitudes are equal and the quadrant therefore questionable. Apparently fixed.

7439 Ho 399

R.A. $15^h\ 50^m\ 35^s$ Decl. $+ 29^\circ\ 53'$

1910.455	112°.7	2″.97
10.460	117.4	3.26
10.465	116.9	3.28
10.507	119.2	3.34
10.509	118.1	3.29
1910.479	116.9	3.23

Apparently an increase in distance but this is not yet certain.

7450 H 577 (9.3 ... 9.8)

R.A. $15^h\ 52^m\ 21^s$ Decl. $+ 35^\circ\ 51'$

1912.297	12°.9	9″.66
12.327	13.2	9.63
12.346	15.5	9.44
1912.323	13.9	9.58

Probably unchanged.

7451 H 258 (9.8 ... 10.5)

R.A. $15^h\ 52^m\ 26^s$ Decl. $+ 36^\circ\ 33'$

1912.272	253°.5	16″.77
12.297	254.9	16.75
12.327	254.3	16.64
1912.299	254.2	16.72

Probably unchanged.

7459 Σ 1991

R.A. $15^h\ 53^m\ 21^s$ Decl. $+ 42^\circ\ 0'$

1911.109	197°.2	3″.25
11.421	193.7	3.44
11.437	196.4	3.15
1911.322	195.8	3.28

There may be very slow decrease in angle.

7466 Σ 1993

R.A. $15^h\ 54^m\ 22^s$ Decl. $+ 17^\circ\ 43'$

1910.378	38°.6	28″.29
10.403	218.7	28.11
10.408	218.3	28.29
1910.396	218.5	28.23

Diminishing distance due to proper motion.

7469 Σ 1994 *rej.* (9.0 ... 10.0)

R.A. $15^h\ 54^m\ 31^s$ Decl. $+ 17^\circ\ 40'$

1910.378	337°.8	21″.49
10.403	338.0	21.43
10.408	338.0	21.41
1910.396	337.9	21.44

No change since Burnham's measures of 1905.

7470 H 4826

R.A. $15^h\ 54^m\ 36^s$ Decl. $- 29^\circ\ 22'$

1912.349	247°.9	5″.00
12.472	248.5	4.97
12.519	247.6	5.08
1912.447	248.0	5.02

Fixed.

7477 OΣ 303

R.A. $15^h\ 55^m\ 18^s$ Decl. $+ 13^\circ\ 37'$

1910.320	145°.3	0″.84(a)
10.351	144.6	0.85
10.359	143.7	0.73
1910.343	144.5	0.81

(a) Very thick. Clean resolution.

The measures are very erratic. Direct motion, of character as yet indeterminate.

13335 Hu 914

R.A. $15^h\ 56^m\ 23^s$ Decl. $- 21^\circ\ 53'$

1912.472	335°.4	3″.18
12.593	335.2	3.26
13.206	335.7	3.09
1912.757	335.4	3.18

As yet no change.

7483 A. G. 200

R.A. 15^h 56^m 56^s Decl. + 39° 56′

1911.109	210°.6	3″.53
11.421	207.8	3.56
11.437	208.0	3.41
1911.322	208.8	3.50

No change.

7487 Σ 1998. *ξ Scorpii*

R.A. 15^h 57^m 46^s Decl. − 11° 3′

A and B

1910.383	144°.9	0″.43
10.449	146.4	0.52
10.473	322.6	0.52
1910.435	144.6	0.49

See *Pub. L. O.* XII for an extended discussion of this interesting binary. Many recent measures.

AB and C

1910.378	63°.0	7″.63
10.383	62.3	7.57
10.403	64.6	7.67
10.408	62.7	7.64
1910.393	63.2	7.63

C is an interesting member of the system. Slow retrograde motion.

7488 Σ 1999

R.A. 15^h 57^m 50^s Decl. − 11° 7′

A and B

1910.378	99°.7	11″.60
10.403	100.3	11.34
10.408	99.5	11.31
1910.396	99.8	11.42

Slowly increasing distance.

A and C

1910.378	81°.9	75″.80
10.403	82.2	75.82
10.408	82.1	75.77
1910.396	82.1	75.80

No prior measures of C.

13337 Hu 1169

R.A. 15^h 58^m 50^s Decl. + 64° 52′

1912.305	63°.6	2″.82
12.346	60.6	2.66
12.354	62.1	2.76
1912.335	62.1	2.75

No motion since discovery.

7499 A. G. 201

R.A. 16^h 0^m 12^s Decl. + 49° 17′

1911.109	251°.0	7″.98
11.150	252.3	8.01
11.429	252.6	7.89
1911.229	252.0	7.96

No change since Espin's measures of 1900.

7507 Hu 155

R.A. 16^h 1^m 58^s Decl. − 12° 25′

1912.297	238°.5	0″.91
15.602	239.0	0.78
1913.949	238.7	0.84

The magnitudes are equal and the quadrant uncertain.

7512 Weisse 30

R.A. 16^h 2^m 27^s Decl. + 20° 42′

1910.222	224°.4	12″.18
10.227	223.4	12.35
10.236	224.0	12.51
1910.228	223.9	12.35

Unaltered.

7514 Σ 2010

R.A. 16^h 2^m 40^s Decl. + 17° 22′

1910.222	10°.0	29″.86
10.227	10.8	29.41
10.236	9.9	29.67
1910.228	10.2	29.65

Slow decrease in distance. β adds a star (13.3) in 212°.3 : 62″.73.

7525 Σ 2012 *rej.*

R.A. $16^h\ 3^m\ 32^s$ Decl. − 7° 56′

1910.222	233°9	21″56
10.227	233.6	21.55
10.236	235.3	21.41
10.246	235.4	21.41
10.255	234.8	.....
1910.237	234.6	21.48

The angle is apparently diminishing and the distance increasing.

7532 H 4839. 12 *Scorpii*

R.A. $16^h\ 4^m\ 51^s$ Decl. − 28° 6′

1910.269	76°7	4″33
10.282	77.8	4.60
10.378	77.5	4.57
1910.310	77.3	4.50

Change is doubtful.

7533 β 120. ν *Scorpii*

R.A. $16^h\ 5^m\ 1^s$ Decl. − 19° 9′

1908.277	363°3	....	12
08.334	357.6	0″71	12
08.400	361.8	0.68	12
08.444	357.7	0.83	12
1908.364	0.1	0.74	

No relative motion.

13340 A 1135

R.A. $16^h\ 5^m\ 29^s$ Decl. + 69° 20′

1912.270	70°1	4″50
12.376	72.8	4.57
12.390	251.2	4.48
1912.345	71.4	4.52

The quadrant is uncertain. Aitken's description is:

1905.56	250°4	4″12	2n

7542 Σ 2017

R.A. $16^h\ 6^m\ 37^s$ Decl. + 14° 52′

1910.222	253°4	27″05
10.227	253.2	27.29
10.236	253.0	27.28
1910.228	253.2	27.21

1909.50	253°5	26″86	3n	Do

[Doberck (*A. N.* 4395)]

The distance is slowly increasing.

7551 Σ 2021

R.A. $16^h\ 7^m\ 42^s$ Decl. + 13° 51′

1910.217	334°3	4″23
10.222	333.9	4.02
10.227	333.1	4.50
1910.222	333.8	4.25

1910.56	335°8	4″25	2n	Lau
1910.37	336.9	4.41	2n	Bu-And

[Lau, Buch-Anderson (*A. N.* 4488)]

Slow direct motion. Many other recent observations.

7552 Σ 2022

R.A. $16^h\ 7^m\ 48^s$ Decl. + 26° 59′

1910.236	133°9	2″80
10.255	133.4	2.82
10.269	133.2	2.80
1910.253	133.5	2.81

Entirely fixed.

7554 Σ 2023

R.A. $16^h\ 8^m\ 36^s$ Decl. + 5° 50′

1910.217	228°8	1″84
10.222	226.6	1.99
10.236	227.6	1.81
1910.225	227.7	1.88

Slight change in angle is indicated.

7563 Σ 2032. σ *Coronae*

R.A. $16^h\ 10^m\ 11^s$ Decl. + 34° 10′

A and B

1912.116	217°3	4″93
12.185	214.8	5.15
12.272	214.5	5.25
12.308	214.3	5.43
1912.220	215.2	5.19

My distance is apparently too great. Many recent measures.

A and D (10.5)

1912.272	85°6	64″63
12.308	85.7	64.64
1912.290	85.6	64.63

Retrograde motion with increasing distance. From measures of D, β gives the proper motion of A as 0″276 in 258°5. (*Carnegie Inst.* 168).

7564 Hu 480

R.A. $16^h\ 10^m\ 16^s$ Decl. + 20° 2′

1910.269	248°.5	....
10.282	253.6	1″.45
10.337	249.9	1.63
10.367	251.7	1.71
1910.314	250.9	1.60

No evidence of motion.

7569 A 23

R.A. $16^h\ 11^m\ 27^s$ Decl. − 7° 6′

1910.337	72°.0	1″.94
10.397	72.6	1.99
10.400	71.2	1.78
1910.378	71.9	1.90

Without change.

7579 Sh 226

R.A. $16^h\ 13^m\ 29^s$ Decl. − 19° 50′

1910.263	20°.4	13″.06
10.269	19.4	12.81
10.277	19.7	13.03
1910.270	19.8	12.97

No evidence of motion.

13344 Hu 1172

R.A. $16^h\ 14^m\ 9^s$ Decl. + 32° 11′

1912.568	328°.0	1″.56
12.582	328.7	1.62
12.612	329.2	1.69
1912.587	328.6	1.62

Without change.

13343 A 1136

R.A. $16^h\ 14^m\ 44^s$ Decl. + 72° 5′

1912.483	3°.5	0″.55
12.612	1.1	0.67
12.689	2.0	0.62
1912.595	2.2	0.61

Unaltered.

7584 Hu 157

R.A. $16^h\ 14^m\ 48^s$ Decl. − 12° 4′

1912.308	259°.8	1″.14
12.319	260.4	1.22
12.593	262.3	1.27
1912.407	260.8	1.21

Without change.

7586 β 1297

R.A. $16^h\ 15^m\ 10^s$ Decl. − 22° 21′

1910.277	132°.4	1″.99
11.465	135.9	2.18
11.539	137.0	2.12
11.547	137.3	2.09
1911.207	135.7	2.09

No evidence of motion.

7594 A 24

R.A. $16^h\ 16^m\ 23^s$ Decl. − 7° 4′

1912.308	330°.4	1″.26
12.686	329.4	1.38
13.436	325.5	1.31
1912.810	328.4	1.32

No evidence of change.

7599 H 4850

R.A. $16^h\ 17^m\ 7^s$ Decl. − 29° 25′

1910.269	349°.3	6″.89
10.282	349.2	6.50
10.299	349.6	6.83
1910.283	349.4	6.74

1909.41	350°.7	6″.30	3n	Doo
1912.52	351.4	6.22	3n	Woods

[Doolittle (*Pub. Flower Obsy.* IV) . . . Woods (*A. J.* 644)]

Probably unchanged.

7615 Σ 2045

R.A. $16^h\ 18^m\ 39^s$ Decl. + 61° 47′

1910.274	180°.7	2″.30
10.427	178.8	2.52
10.433	179.4	2.49
1910.378	179.6	2.44

No motion.

7623 Σ 2046

R.A. $16^h\ 19^m\ 50^s$ Decl. + 64° 39′

A and B

1910.236	220°8	8″01
10.274	220.4	7.95
10.427	221.0	7.97
1910.312	220.7	7.98

The angle may be slightly smaller than in the early measures.

A and C

1910.236	136°6	29″06
10.274	137.2	29.16
10.427	137.4	29.22
1910.312	137.1	29.15

No prior measures.

7629 Hu 158

R.A. $16^h\ 20^m\ 26^s$ Decl. − 11° 49′

1912.478	135°8	0″48

Hussey's description is:

1900.50	134°5	0″46	8.8 ... 9.0

7631 *α Scorpii*

R.A. $16^h\ 22^m\ 3^s$ Decl. − 26° 10′

1911.465	275°8	3″67
13.291	267.8	3.38
13.425	266.6	3.61
13.436	263.1	3.78
13.450	271.3	3.21
1913.013	268.9	3.53

No relative motion.

7632 Σ 2054. *Draconis* 99

R.A. $16^h\ 22^m\ 12^s$ Decl. + 61° 58′

1911.150	353°5	1″10
11.467	353.0	1.12
11.498	355.7	1.09
11.500	356.5	1.39
1911.404	354.7	1.18

1910.57	355°9	1″14	2n	Jost

[Jost (*A. N.* 4425)]

Slow retrograde motion.

7634 OΣ 312. *η Draconis*

R.A. $16^h\ 22^m\ 22^s$ Decl. + 61° 47′

1911.467	140°3	5″43
11.498	141.9	5.40
11.500	141.6	5.49
1911.488	141.3	5.44

Retrograde motion with increasing distance.

7637 Σ 2049

R.A. $16^h\ 22^m\ 58^s$ Decl. + 26° 15′

1910.452	203°4	1″25
10.455	202.8	1.10
10.473	201.0	1.32
1910.460	202.4	1.22

Retrograde motion without change in distance. Many recent measures.

7638 *β* 813

R.A. $16^h\ 23^m\ 2^s$ Decl. + 26° 48′

1910.473	164°2	1″13
10.487	163.4	0.85
10.509	344.6	1.11
1910.490	164.1	1.03

1911.49	164°6	1″13	3n	Do

[Doberck (*A. N.* 4529)]

No evidence of motion.

7642 Σ 2052. *Herculis* 71

R.A. $16^h\ 23^m\ 37^s$ Decl. + 18° 40′

1910.449	84°8	0″99
10.452	263.6	0.96
10.471	84.8	0.99
1910.457	84.4	0.98

Retrograde motion with decrease in distance. This binary is now at a very interesting stage.

7649 Σ 2055. *λ Ophiuchi*

R.A. $16^h\ 24^m\ 52^s$ Decl. + 2° 15′

1910.452	67°3	1″17
10.473	69.6	1.41
10.487	67.9	1.28
1910.471	68.3	1.29

An interesting binary of which there are many recent observations.

7650 Hu 663

R.A. $16^h\ 24^m\ 59^s$ Decl. $+51°\ 51'$

1912.346	231°.8	2″.92(a)
12.354	235.6	3.19
12.376	240.1	2.89
12.420	235.5	3.09
1912.374	235.7	3.02

(a) Difficult. Poor seeing.
Apparently fixed.

7651 Σ 3105

R.A. $16^h\ 25^m\ 21^s$ Decl. $-6°\ 46'$

1910.383	16°.9	0″.36
12.478	22.7	0.42
15.602	19.5	0.45
1912.821	19.7	0.41

1909.52	31°.7	0″.49	3n	Doo
1911.52	28.7	0.41	2n	A
1912.56	26.9	0.44	1n	A

[Doolittle (*Pub. Flower Obsy.* IV) . . . Aitken (*Pub. L. O.* XII)]

Slow retrograde motion.

7658 Σ 2060

R.A. $16^h\ 26^m\ 9^s$ Decl. $+57°\ 0'$

1910.430	67°.5	3″.74
10.433	66.5	3.80
10.460	245.9	3.83
1910.441	66.6	3.79

Immobile.

7662 Ho 407

R.A. $16^h\ 26^m\ 20^s$ Decl. $-10°\ 18'$

1910.408	216°.7	14″.57
10.416	216.7	14.42
10.427	215.6	14.42
1910.417	216.3	14.47

Fixed.

7664 Copeland

R.A. $16^h\ 26^m\ 27^s$ Decl. $+60°\ 57'$

1911.150	75°.4	1″.33
11.498	75.3	1.39
11.500	73.1	1.37
1911.383	74.6	1.36

1897.70	72°.2	1″.69	3n	Doo
1908.55	74.8	1.31	3n	Bies

[Doolittle (β G. C.) . . . Van Biesbroeck (*Ann. Observ. Belgique*, N. S. XIII)]

Probably unchanged.

7671 Σ 2075

R.A. $16^h\ 28^m\ 7^s$ Decl. $+80°\ 19'$

1912.354	322°.1	1″.41
12.483	315.3	1.38
12.612	318.6	1.25
1912.483	318.7	1.35

Possibly some slight increase in angle.

7683 β 356

R.A. $16^h\ 29^m\ 42^s$ Decl. $+69°\ 12'$

1910.460	116°.3	7″.21
10.463	115.6	7.24
10.531	114.8	7.32
1910.485	115.6	7.26

No certain evidence of motion.

13351 A 1139

R.A. $16^h\ 30^m\ 10^s$ Decl. $+57°\ 38'$

1912.346	88°.0	2″.27
12.376	88.7	2.12
12.390	89.9	2.23
1912.371	88.9	2.21

No change since the original measures of 1905.

7688 H 4872 (11.4 . . . 12.5)

R.A. $16^h\ 30^m\ 54^s$ Decl. $-27°\ 34'$

1910.430	260°.5	11″.01
10.433	260.6	11.40
10.444	260.9	12.11(a)
10.523	261.8	11.17
1910.457	260.9	11.42

(a) Exceedingly faint.
32ˢ *f* and 249″ *n* of CPD − 27° (5437).

7689 H 4875 (10.9 . . . 12.0)

R.A. $16^h\ 31^m\ 1^s$ Decl. $-27°\ 32'$

1910.430	267°.9	8″.53
10.433	267.5	8.52
10.444	266.4	. . . .
10.523	267.7	8.62
1910.457	267.4	8.56

Herschel's description is:

1834.3	275° ±	8″ ±

39½ˢ *f* and 362″ *n* of CPD − 27° (5437).

7697 H 4879

R.A. $16^h\ 32^m\ 30^s$ Decl. − 17° 30′

A and B

1910.430	339°3	19″50
10.433	339.5	19.71
10.444	339.2	19.62
1910.436	339.3	19.61

No early measures.

A and C

1910.430	74°2	36″57
10.433	74.6	36.57
10.444	74.8	36.82
1910.436	74.5	36.65

No prior measures of C although its presence had been noted.

7698 H 4878

R.A. $16^h\ 32^m\ 44^s$ Decl. − 27° 45′

1910.378	357°0	8″70
10.430	357.3	8.59
10.433	357.7	8.37
10.444	357.2	8.56
10.507	357.1	8.70
1910.438	357.3	8.58

Unaltered.

7701 Σ 2073 *rej.*

R.A. $16^h\ 33^m\ 18^s$ Decl. + 16° 27′

1910.482	76°8	27″78
10.487	76.7	27.69
10.493	76.9	27.63
1910.487	76.8	27.70

1909.51	76°8	27″84	2n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Change is doubtful.

7703 Σ 2078. 17 *Draconis*

R.A. $16^h\ 33^m\ 23^s$ Decl. + 53° 10′

A and B

1910.512	111°4	3″74
10.531	108.5	3.70
10.551	110.4	3.64
11.435	110.5	3.50
1910.757	110.2	3.64

Probably very slow retrograde motion.

A and C

1910.512	194°1	89″51
10.531	194.1	89.99
10.551	194.2	90.41(a)
11.498	194.1	90.23
1910.773	194.1	90.04

(a) Seeing very poor.

No prior measures of C.

7708 Σ 2080

R.A. $16^h\ 34^m\ 26^s$ Decl. + 38° 34′

1910.482	23°1	2″67
10.531	21.4	2.89
11.500	22.3	3.00
1910.838	22.3	2.85

1907.20	22°0	2″58	4n	Doo
1910.36	24.6	2.83	2n	β

[Doolittle (*Pub. Flower Obsy.* IV) . . . β (*Carnegie Inst.* 168)]

Decreasing distance.

7712 β 42

R.A. $16^h\ 35^m\ 20^s$ Decl. + 29° 15′

1910.482	40°8	7″49
10.493	38.4	7.82
10.507	38.5	7.66
1910.494	39.2	7.66

Fixed.

7714 Σ 2082. 42 *Herculis*

R.A. $16^h\ 35^m\ 29^s$ Decl. + 49° 10′

1912.346	91°1	24″46
12.390	92.1	24.32
12.420	92.1	24.38
12.426	92.6	24.20
1912.395	92.0	24.34

A is quite red. Type M_a. Increasing distance.

7717 Σ 2084. ξ *Herculis*

R.A. $16^h\ 36^m\ 47^s$ Decl. + 31° 49′

1911.467	140°3	1″44
11.500	141.0	1.69
11.506	.....	1.37
11.711	140.7	1.42
1911.546	140.7	1.48

There are many recent observations of this rapid binary.

7725 Σ 2085. *Herculis* 130

R.A. 16ʰ 37ᵐ 17ˢ Decl. + 21° 49′

1910.473	308°9	6″23
10.479	308.6	6.25
10.482	306.4	6.25
10.487	308.0	6.31
10.493	308.1	6.08
1910.483	308.0	6.22

Entirely fixed.

7750 A 27

R.A. 16ʰ 40ᵐ 21ˢ Decl. − 2° 59′

1912.297	19°6	2″21
12.319	21.1	2.29
12.349	23.2	2.43(a)
1912.322	21.3	2.31

(a) Seeing very poor.

Aitken's original measure is:

1899.54	21°7	1″94	3n

7752 Σ 2100 *rej.*

R.A. 16ʰ 40ᵐ 38ˢ Decl. + 50° 53′

1911.528	294°5	23″48
11.533	294.1	23.39
11.541	295.0	23.11
1911.534	294.5	23.33

No measures prior to 1900.

7753 H 4887. CPD − 28° (5417–18)

R.A. 16ʰ 40ᵐ 44ˢ Decl. − 28° 31′

1911.421	92°1	21″32
11.424	92.8	21.41(a)
11.503	92.5	20.58
11.547	92.9	20.70
1911.474	92.6	21.00

(a) Seeing very poor.

Probably unchanged.

7756 Es 76

R.A. 16ʰ 40ᵐ 58ˢ Decl. + 50° 50′

A and B

1911.528	44°8	2″54
11.533	44.5	2.70
11.541	41.0	2.52
1911.534	43.4	2.57

Apparently fixed.

A and C

1911.528	204°6	43″98
11.533	204.3	43.94
11.541	204.6	44.07
1911.534	204.5	44.00

There are no prior measures of C.

7760 H 4888. SD − 19° (4434) (9.2 ... 9.2)

R.A. 16ʰ 41ᵐ 59ˢ Decl. − 19° 23′

1911.421	269°2	8″16
11.424	267.2	8.25
11.503	266.4	8.16
1911.449	267.6	8.19

1912.54	264°8	7″86	4n	Woods

[Woods (*A. J.* 644)]

Herschel gives the angle as 310°8.

7762 A 227

R.A. 16ʰ 42ᵐ 6ˢ Decl. + 27° 14′

1912.349	91°3	2″15
12.366	89.8	2.21
12.472	91.6	2.09
1912.396	90.9	2.15

1909.30	89°1	1″97	3n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

The magnitudes are equal. Evidence of change is uncertain.

7768 Σ 2103

R.A. 16ʰ 44ᵐ 2ˢ Decl. + 13° 28′

1910.515	37°6	5″58
10.529	41.0	5.80
10.542	41.7	5.82
10.545	40.7	5.59
1910.533	40.2	5.70

No significant change. β adds faint stars.

7770 A. G. 206

R.A. 16ʰ 44ᵐ 35ˢ Decl. + 67° 0′

1910.515	153°1	5″91
10.531	155.4	5.86
10.551	153.4	5.88
1910.532	154.0	5.88

The measures of angle are rather erratic.

7779 β 627. 52 *Herculis*

R.A. $16^h\ 45^m\ 43^s$ Decl. $+46°\ 12'$

1911.506	325°.0	1″.68
11.711	325.3	1.60
11.736	326.1	1.71
1911.651	325.5	1.66

Direct motion with no change in distance.

7785 β 821

R.A. $16^h\ 47^m\ 13^s$ Decl. $+32°\ 3'$

1911.437	312°.1	1″.31
11.500	314.3	1.45
11.506	315.2	1.32
11.539	314.4	1.35
1911.496	314.0	1.36

No change since discovery in 1881.

7788 Hu 159

R.A. $16^h\ 48^m\ 9^s$ Decl. $-11°\ 21'$

1910.529	146°.9	4″.44
10.545	146.8	4.32
10.551	147.6	4.20
1910.542	147.1	4.32

Unaltered.

7789 Ho 65

R.A. $16^h\ 48^m\ 12^s$ Decl. $+22°\ 53'$

1912.472	144°.0	2″.21
12.612	151.6	2.09(a)
12.675	152.0	2.14(a)
12.691	154.7	....(a)
1912.612	150.6	2.15

(a) B very faint.
Without motion.

7796 Swift (8.8 ... 11.5)

R.A. $16^h\ 48^m\ 39^s$ Decl. $+53°\ 59'$

1908.392	198°.9	7″.09	40
08.553	196.0	....	12
08.564	197.9	7.19	40
1908.503	197.6	7.14	

Fixed.

7797 Hu 233

R.A. $16^h\ 48^m\ 48^s$ Decl. $-11°\ 41'$

1910.529	63°.2	4″.85
10.545	64.1	4.82
10.551	63.9	4.72
1910.542	63.7	4.80

No change.

7802 A. G. 207

R.A. $16^h\ 49^m\ 39^s$ Decl. $+24°\ 43'$

1912.349	210°.8	3″.07
12.426	211.6	2.92
12.472	211.3	3.06
1912.416	211.2	3.02

The distance seems to be increasing.

7803 Sh 240

R.A. $16^h\ 50^m\ 1^s$ Decl. $-19°\ 21'$

1910.529	230°.5	4″.97
10.545	230.4	4.84
10.551	228.5	5.24
10.562	229.3	4.99
1910.547	229.7	5.01

Fixed.

7817 Σ 3107

R.A. $16^h\ 52^m\ 52^s$ Decl. $+4°\ 9'$

1910.509	93°.0	1″.56
10.545	94.9	1.59
10.551	94.6	1.47
1910.535	94.2	1.54

Retrograde motion.

.... Roe 38. SD − 12° (4634) (9.4 ... 10.6)

R.A. $16^h\ 53^m\ 8^s$ Decl. $-12°\ 50'$

1909.246	195°.4	6″.19	40
09.312	194.9	6.20	40
1909.279	195.1	6.19	

This pair is 40^s *f* and 10′ *n* of **7813** = Hn 27. The measures are prior to Roe's discovery on May 29, 1910.

7822 Σ 2112

R.A. $16^h\ 53^m\ 42^s$ Decl. + 31° 58′

1911.506	259°.0	2″.14
11.528	260.5	2.00
11.533	257.7	1.88
11.539	260.4	2.11
1911.527	259.4	2.03

Immobile.

7825 OΣ 321

R.A. $16^h\ 53^m\ 55^s$ Decl. + 14° 29′

1912.478	4°.6	0″.47
12.480	7.4	0.48
12.483	4.6	0.48
1912.480	5.5	0.48

No evidence of motion.

7828 Σ 2116

R.A. $16^h\ 54^m\ 15^s$ Decl. + 63° 43′

1910.515	4°.5	19″.31
10.531	4.7	19.13
10.551	4.4	19.26
1910.532	4.5	19.23

Fixed.

7834 Σ 2118. 20 *Draconis*

R.A. $16^h\ 55^m\ 49^s$ Decl. + 65° 13′

1912.483	82°.2	0″.38
12.612	80.9	0.39(a)
12.730	76.2	0.40
1912.608	79.8	0.39

(a) Clean resolution.

Aitken (*Pub. L. O.* XII) and Van Biesbroeck (*Ann. Observ. Belgique*, N. S. XIII) have extended series of observations of this star. The character of the motion is still uncertain.

7837 Σ 2114

R.A. $16^h\ 56^m\ 13^s$ Decl. + 8° 37′

1908.334	158°.9	1″.45	12
08.392	164.2	1.40	40
08.455	162.3	1.19	12
08.507	161.9	1.39	40
1908.422	161.8	1.36	

Direct motion with invariable distance.

7838 Σ 2113

R.A. $16^h\ 56^m\ 19^s$ Decl. + 7° 23′

1908.392	117°.7	4″.95	40
08.416	117.3	5.11	12
08.455	119.1	5.13	12
1908.421	118.0	5.06	

Apparently unchanged.

7856 β 357

R.A. $16^h\ 59^m\ 52^s$ Decl. + 10° 43′

1912.568	299°.7	1″.28
12.612	301.5	1.37
12.675	301.8	1.34
1912.618	301.0	1.33

Evidence of change is inconclusive.

7864 H 2804

R.A. $17^h\ 0^m\ 31^s$ Decl. + 39° 9′

A and B

1909.367	275°.4	14″.76	40	
09.835	275.1	14.34		
10.208	275.1	14.57		
10.531	275.2	14.14		
1909.985	275.2	14.45		
1910.63	275°.5	14″.66	3n	Woods

[Woods (*A. J.* 644)]

Retrograde motion with decreasing distance.

A and C (11.6)

1909.367	179°.1	80″.35	40
15.599	178.6	80.71	
15.604	179.0	80.58	
1913.523	178.9	80.55	

A and D (11.1)

1909.367	141°.8	89″.55	40
09.835	141.9	89.40	
1909.601	141.8	89.47	

There are no prior measures of C or D.

7869 OΣ (App) 151

R.A. 17^{h} 1^{m} 15^{s} Decl. + 53° 24′

A and B

1909.271	172°5	80″27	40
09.406	172.7	80.55	40
09.425	172.6	80.55	40
09.502	172.5	80.51	40
1909.401	172.6	80.47	

The distance is increasing.

B and C

1909.271	357°6	18″47	40
09.406	359.3	18.41	40
09.502	359.0	18.33	40
1909.393	358.6	18.40	

No measures of C previous to 1905.

7874 H 4923. SD – 18° (4427) (8.2 ... 10.3)

R.A. 17^{h} 2^{m} 7^{s} Decl. – 18° 6′

1909.312	160°0	9″49	40
09.331	160.0	9.42	40
09.502	159.7	9.56	40
12.439	157.8	9.48	
13.332	157.8	9.41	
1910.783	159.1	9.47	

Retrograde motion with increase in distance.

7878 Σ 2130. *μ Draconis*

R.A. 17^{h} 2^{m} 51^{s} Decl. + 54° 38′

1912.415	315°3	2″39
12.426	131.9	....
12.480	314.1	2.31
12.483	132.2	2.40
1912.451	133.4	2.37

A binary of long and as yet indeterminate period.

.... SD – 15° (4465) (10.0 ... 10.0)

R.A. 17^{h} 3^{m} 10^{s} Decl. – 15° 56′

1908.507	113°7	15″36	40
08.564	294.0	15.31	40
08.583	113.4	15.33	40
1908.551	113.7	15.33	

Noted with the 12-inch.

.... SD – 16° (4429) (10 ... 10)

R.A. 17^{h} 3^{m} 38^{s} Decl. – 16° 8′

1908.507	183°5	9″38	40
08.564	183.1	9.54	40
08.583	183.0	9.67	40
1908.551	183.2	9.53	

Noted with the 12-inch.

.... BD 82° (500) (9.5 ... 11.8)

R.A. 17^{h} 4^{m} 42^{s} Decl. + 82° 2′

1913.502	89°1	12″45
13.682	89.2	12.17
14.476	88.3	12.52
1913.887	88.9	12.38

Follows **7835** = β 955.

7897 Hu 170

R.A. 17^{h} 6^{m} 33^{s} Decl. + 9° 54′

1910.337	270°6	1″80
10.397	271.1	1.72
10.400	270.1	1.81
1910.378	270.6	1.78

No evidence of motion.

7900 OΣ 325

R.A. 17^{h} 7^{m} 12^{s} Decl. + 7° 54′

1908.392	205°0	1″39	40
08.455	203.6	1.06	12
08.465	205.1	1.09	12
1908.437	204.6	1.18	

Diminishing distance.

7914 Σ 2140. *α Herculis*

R.A. 17^{h} 9^{m} 10^{s} Decl. + 14° 32′

1907.485	112°5	4″97	12
07.701	113.4	4.72	12
07.711	114.9	5.21	12
1907.632	113.6	4.97	

7916 Hu 488

R.A. 17^{h} 9^{m} 18^{s} Decl. + 20° 4′

1912.272	107°.0	2″.98
12.297	109.0	2.97
12.308	108.3	3.03
1912.292	108.1	2.99

No evidence of motion.

7922 Σ 3127. *δ Herculis*

R.A. 17^{h} 10^{m} 6^{s} Decl. + 24° 59′

1912.366	195°.8	13″.21
12.426	196.4	13.18
12.472	195.2	13.30
12.478	195.8	13.15
1912.435	195.8	13.21

Relative motion due to difference between the proper motions.

7924 Hu 489

R.A. 17^{h} 10^{m} 21^{s} Decl. + 20° 15′

1912.308	43°.7	0″.80
12.352	46.8	0.91
12.478	43.8	0.83
1912.379	44.8	0.85

As yet no significant change.

13369 A 1148

R.A. 17^{h} 11^{m} 17^{s} Decl. + 7° 33′

1912.366	352°.8	2″.08
12.379	353.3	2.12
12.467	352.2	1.91
1912.404	352.8	2.04

Aitken's description is:

1905.65 356°.3 1″.94 2n

7936 OΣ 327

R.A. 17^{h} 11^{m} 53^{s} Decl. + 56° 16′

1912.483	143°.3	0″.36
12.612	327.9	0.37
12.730	326.5	0.45
1912.608	325.9	0.39

Aitken has an interesting series of measures of this pair (*Pub. L. O.* XII) where is found:

1912.59 326°.2 0″.42 2n

7940 OΣ 326

R.A. 17^{h} 12^{m} 34^{s} Decl. + 9° 39′

1909.406	211°.8	16″.09	40
09.502	211.9	16.03	40
09.520	.....	16.02	40
1909.476	211.8	16.05	

1911.43 212°.9 16″.09 3n β

[β (*Carnegie Inst.* 168)]

Increase in both angle and distance.

7953 Σ 2149

R.A. 17^{h} 13^{m} 32^{s} Decl. − 6° 18′

1910.148	21°.1	8″.00(a)
10.167	21.4	7.73(b)
10.200	22.0	7.61
1910.172	21.5	7.78

(a) Temperature = − 6° F. (b) Very faint. Moon, dawn, fog.

The measures are very erratic for such an easy pair.

7958 A 28 = Ho 631

R.A. 17^{h} 14^{m} 15^{s} Decl. − 8° 55′

1910.473	36°.4	1″.93
10.482	41.7	1.88
10.496	37.4	1.81
10.509	38.6	2.02
1910.490	38.5	1.91

I make the distance somewhat greater than other observers.

7965 Σ 2153

R.A. 17^{h} 14^{m} 50^{s} Decl. + 49° 26′

1910.351	263°.2	1″.96
11.473	261.9	1.97
11.498	262.4	1.93
1911.107	262.5	1.95

Apparently slow retrograde motion. Several recent observations.

.... SD − 15° (4525) (9.7 ... 9.9)

R.A. 17^{h} 14^{m} 51^{s} Decl. − 15° 36′

A and B

1908.444	268°.8	9″.36	12
08.507	269.1	9.49	40
08.564	269.8	9.36	40
08.583	269.9	9.54	40
1908.524	269.4	9.44	

A and C (11.5)

1908.507	64°1	11″27	40
08.564	64.0	10.59	40
08.583	64.2	10.73	40
1908.551	64.1	10.86	

.... SD − 15° (4530) (9.8 ... 10.3)

R.A. 17ʰ 15ᵐ 22ˢ Decl. − 15° 46′

A and B

1908.507	32°9	6″49	40
08.564	32.1	6.71	40
08.583	32.6	6.45	40
1908.551	32.5	6.55	

Found with the 12-inch.

A and C (11.5)

1908.507	279°1	18″63	40
08.564	280.1	18.62	40
08.583	280.6	18.83	40
1908.551	279.9	18.69	

No prior measures.

7994 β 46

R.A. 17ʰ 18ᵐ 7ˢ Decl. + 13° 31′

1908.334	202°9	2″29	12
08.392	202.8	2.22	40
08.465	200.5	2.12	12
08.479	198.7	1.94	12
1908.417	201.2	2.14	

No evidence of motion.

.... SD − 9° (4548) (9.8 ... 10.7)

R.A. 17ʰ 18ᵐ 25ˢ Decl. − 9° 25′

A and B

1910.378	128°0	6″87
10.403	128.4	6.43
10.427	124.5	6.92
1910.403	127.0	6.74

A and C (11.9)

1910.378	322°3	7″15
10.403	324.5	6.68
10.427	322.2	7.20
1910.403	323.0	7.01

No prior measures.

8001 Σ 2159

R.A. 17ʰ 19ᵐ 24ˢ Decl. + 13° 26′

1908.553	325°8	26″84	12
08.520	326.1	26.55	12
1908.536	326.0	26.70	

Apparently fixed.

8003 Σ 2161. *ρ Herculis*

R.A. 17ʰ 19ᵐ 33ˢ Decl. + 37° 15′

1907.485	314°0	4″41	12
07.701	311.9	4.19	12
07.711	311.9	4.20	12
1907.632	312.6	4.27	

Perhaps slight increase in angle.

8004 Σ 2163

R.A. 17ʰ 19ᵐ 36ˢ Decl. + 42° 16′

1911.506	89°2	1″51
11.541	87.3	1.53
11.574	91.6	1.53
11.670	88.1	1.50
1911.573	89.1	1.52

Slow decrease in angle. The stars are of equal magnitude.

8015 Σ 2167 *rej.* BD 49° (2629)

R.A. 17ʰ 21ᵐ 21ˢ Decl. + 49° 38′

1909.367	221°3	18″48	40
09.520	220.9	18.63	40
09.766	220.5	18.48	
1909.551	220.9	18.53	

The measures of this pair date from 1900. No change.

8016 Es —

R.A. 17ʰ 21ᵐ 25ˢ Decl. + 63° 52′

1910.460	14°2	4″50(a)
10.512	17.4	4.59
10.531	19.9	4.66
1910.501	17.2	4.58

(a) B faint. Moon and clouds.

Espin's description is:

1903	19°1	6″5	9.0 ... 11.5

8017 Σ 2165. *Herculis* 281

R.A. $17^h\ 21^m\ 35^s$ Decl. + 29° 34′

A and B

1910.255	55°.0	8″.16
10.269	55.1	8.53
10.274	54.1	8.34
1910.266	54.7	8.34

Slow direct motion with increasing distance. Several recent measures.

A and C

1910.255	251°.3	97″.41
10.269	251.4	96.58
10.274	251.2	96.74
1910.266	251.3	96.91

Glasenapp gives the position for 1890 as 251°.6: 98″.15 and β for 1909.35 as 251°.7 : 96″.72. There may be some change in distance.

8019 A 29

R.A. $17^h\ 21^m\ 41^s$ Decl. − 8° 34′

1910.378	95°.2	3″.26
10.397	95.2	3.29
10.400	95.7	3.31
1910.392	95.4	3.29

1911.31 96°.4 2″.73 2n Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Probably unchanged.

8025 Σ 2171

R.A. $17^h\ 22^m\ 40^s$ Decl. − 9° 54′

1910.359	65°.7	1″.71
10.367	66.5	1.57
10.383	64.6	1.57(a)
1910.370	65.6	1.62

(a) Very thick. Foghorn sounding.

Slow retrograde motion.

8026 Hu 672

R.A. $17^h\ 22^m\ 40^s$ Decl. + 51° 36′

1912.502	60°.3	4″.17
12.505	58.9	4.21
12.511	57.8	4.21
1912.506	59.0	4.20

Apparently fixed.

8028 Σ 2170

R.A. $17^h\ 23^m\ 4^s$ Decl. + 10° 35′

1910.263	69°.9	3″.74
10.266	68.7	3.49
10.269	69.3	3.90
1910.266	69.3	3.71

Possibly slow retrograde motion.

8038 Σ 2173. *Ophiuchi* 221

R.A. $17^h\ 24^m\ 14^s$ Decl. − 0° 58′

1912.478	346°.4	0″.32(a)
12.480	172.1	0.31
13.206	348.3	0.42(a)
1912.721	348.9	0.35

(a) Difficult.

In *Pub. L. O.* XII Aitken gives an extended series of measures. The last is:

1912.56 173°.9 0″.30 2n A

A binary which has completed nearly two revolutions.

.... BD 49° (2653) (8.0 ... 10.7)

R.A. $17^h\ 28^m\ 33^s$ Decl. + 49° 48′

1909.425	230°.3	44″.40	40
09.520	230.0	44.40	40
1909.473	230.1	44.40	

13385 Hu 923

R.A. $17^h\ 31^m\ 19^s$ Decl. + 49° 18′

1912.508	97°.1	0″.88(a)
12.511	98.3	0.92
12.612	98.7	0.92
1912.544	98.0	0.91

(a) Clouds.

As yet no motion.

.... Anon. (10.0 ... 10.5)

R.A. $17^h\ 31^m\ 40^s$ Decl. − 15° 15′

1908.518	195°.2	14″.52	12
08.520	195.6	14.31	12
08.545	192.4	14.17	40
08.564	192.4	14.23	40
08.583	193.0	14.32	40
1908.546	193.7	14.31	

$28^s.5$ *f* and 109″ *n* of SD − 15° (4626).

13386 A 1157

R.A. $17^{h}\ 32^{m}\ 51^{s}$ Decl. + 6° 17′

1912.568	275°9	1″25
12.582	277.0	1.42
12.680	276.5	1.33
1912.610	276.5	1.33

Without motion.

.... Anon. (10.0 ... 12.5)

R.A. $17^{h}\ 33^{m}\ 2^{s}$ Decl. − 15° 8′

1908.564	11°1	7″33	40
15.470	10.9	7.09	
1912.017	11.0	7.21	

3^{s} *f* and 201″2 *s* of SD − 15° (4636).

13387 A 1158 (9.2 ... 11.8)

R.A. $17^{h}\ 33^{m}\ 7^{s}$ Decl. + 7° 19′

1912.319	108°3	4″84
12.352	107.9	4.85
12.467	109.2	4.75
1912.379	108.5	4.81

Aitken's original measures give:

1905.65	109°0	4″42	2n

8106 Skinner —— = Hu 184

R.A. $17^{h}\ 35^{m}\ 20^{s}$ Decl. − 15° 40′

1908.518	274°6	4″45	12
08.613	273.8	4.37	12
08.616	275.0	4.45	40
1908.582	274.5	4.42	

Fixed.

13391 A 695

R.A. $17^{h}\ 36^{m}\ 3^{s}$ Decl. + 41° 23′

1912.415	226°2	3″41
12.420	225.6	3.55
12.426	223.4	3.41
1912.420	225.1	3.46

No evidence of change.

.... SD − 15° (4670) (9.9 ... 12.7)

R.A. $17^{h}\ 39^{m}\ 2^{s}$ Decl. − 15° 31′

1908.564	55°2	21″69	12
08.616	55.4	21.56	12
1908.590	55.3	21.62	

13394 A 1162

R.A. $17^{h}\ 41^{m}\ 4^{s}$ Decl. + 6° 34′

1912.568	161°3	1″90
12.582	158.4	2.05
12.686	160.6	1.94(a)
1912.612	160.1	1.96

(a) C is visible, but too faint for reliable measures. Aitken's position is:

1905.65	163°2	1″72	2n

8213 Lewis 17. BD 15° (3275) (10.2 ... 11.0)

R.A. $17^{h}\ 42^{m}\ 51^{s}$ Decl. + 15° 49′

A and B

1911.489	274°3	1″90
11.495	274.8	2.05
11.498	274.0	1.88
12.297	275.1	2.03
1911.695	274.6	1.97

There is some doubt as to the identification of this pair with Lewis 17. His description is:

1902.67	292°7	2″18	1n	9.0 ... 9.5

A and C

1911.489	179°7	48″08
11.498	179.9	48.27
12.297	180.0	48.44
1911.761	179.9	48.26

8177 β 358

R.A. $17^{h}\ 43^{m}\ 10^{s}$ Decl. + 34° 32′

1911.700	202°2	4″69
11.708	202.3	4.78
11.711	202.9	4.70
1911.706	202.5	4.72

Probably unchanged.

.... SD − 15° (4699) (8.7 ... 10.6)

R.A. $17^{h}\ 44^{m}\ 35^{s}$ Decl. − 15° 27′

1908.520	148°.9	27″.11	12
08.636	147.8	26.84	12
1908.578	148.4	26.97	

8210 OΣ 338. BD 15° (3292)

R.A. $17^{h}\ 46^{m}\ 34^{s}$ Decl. + 15° 21′

1910.359	187°.1	0″.68(a)
10.367	187.7	0.70(a)
10.383	8.6	0.59
11.489	8.5	0.76
11.495	9.1	0.75
11.498	8.7	0.71
1910.932	8.3	0.70

(a) Very thick.
Slow diminution in angle.

13400 A 698

R.A. $17^{h}\ 46^{m}\ 38^{s}$ Decl. + 41° 14′

A and B

1912.349	255°.4	4″.18
12.366	257.3	4.08
12.379	256.8	4.10
1912.365	256.5	4.12

No indication of motion.

A and C

1912.349	164°.3	28″.37
12.366	164.5	28.21
12.379	164.0	28.33
1912.365	164.3	28.30

There are no prior measures.

8212 Ho 561

R.A. $17^{h}\ 46^{m}\ 49^{s}$ Decl. − 5° 54′

1910.465	327°.5	32″.84
10.479	327.7	33.12
10.482	327.6	32.71
1910.475	327.6	32.89

Hough gave the distance as 32″.12 for 1897. For 1902 Doolittle finds 32″.93. Possibly some change but it is not yet certain.

.... Anon. (10.5 ... 11.5)

R.A. $17^{h}\ 47^{m}\ 52^{s}$ Decl. − 15° 2′

1908.636	72°.6	8″.40	12
08.644	70.3	8.17	40
1908.640	71.4	8.28	

96ˢ *p* and 31″.2 *s* of SD − 15° (4725).

8235 β 130. 90 *Herculis*

R.A. $17^{h}\ 49^{m}\ 24^{s}$ Decl. + 40° 20′

1911.566	114°.9	2″.06
11.577	120.0	2.14
11.629	125.8	1.99
11.651	121.7	1.85
11.736	123.4	1.72
1911.632	121.2	1.95

No relative motion discernible.

8237 A. Clark 9

R.A. $17^{h}\ 49^{m}\ 31^{s}$ Decl. + 29° 50′

1911.566	235°.1	1″.13
11.626	233.1	0.97
11.629	231.4	1.15
1911.607	233.2	1.08

Unaltered since the first measures of 1857.

8242 OΣ 339

R.A. $17^{h}\ 51^{m}\ 3^{s}$ Decl. + 21° 31′

1910.458	174°.2	3″.31
10.460	173.2	3.32
10.465	173.3	3.53
1910.461	173.6	3.39

Slow retrograde motion with perhaps some increase in distance.

8244 H 5003

R.A. $17^{h}\ 51^{m}\ 23^{s}$ Decl. − 30° 14′

1910.465	106°.0	6″.32
10.479	106.6	6.11
10.482	108.1	6.41
10.487	106.0	5.83
1910.478	106.7	6.17

The measures are rather discordant. Most recent observations show the distance less.

8245 Ho 72 (9.5 . . . 11.0)

R.A. 17ʰ 51ᵐ 27ˢ Decl. + 33° 27′

A and B

1912.349	1°.3	9″.71
12.358	0.4	9.75
12.472	1.0	9.75
1912.391	0.9	9.74

A case of large proper motion, given by β (*Carnegie Inst.* 168) as 0″.250 in 359°.7.

A and C (13.5)

1912.349	36°.3	9″.60
12.352	36.9	9.45
12.472	35.9	9.68
1912.391	36.4	9.58

As A and C show no relative motion, C is accompanying A or the faint star B is exhibiting extraordinary motion.

8247 Σ 2251

R.A. 17ʰ 51ᵐ 32ˢ Decl. + 49° 39′

1912.270	27°.1	15″.43
12.420	25.7	15.36
12.502	25.8	15.37
1912.397	26.2	15.39

1905.57	27°.8	15″.35	2n	Bies
1909.29	27.3	15.15	3n	β

[Van Biesbroeck (*A. N.* 4107) . . . β (*Carnegie Inst.* 168)]

Slow retrograde motion with increase in distance.

8248 Kr 47

R.A. 17ʰ 51ᵐ 40ˢ Decl. + 64° 16′

1910.460	202°.9	7″.66
10.463	202.6	7.79
10.465	202.8	7.81
1910.463	202.8	7.75

Probably unchanged.

8249 β 1299

R.A. 17ʰ 51ᵐ 50ˢ Decl. + 10° 58′

A and B

1912.412	334°.4	0″.38
12.675	158.0	0.42
1912.543	156.2	0.40

A and C

1912.675	63°.5	26″.93
14.416	62.5	26.76
1913.545	63.0	26.84

No change.

8255 Σ 2253

R.A. 17ʰ 52ᵐ 15ˢ Decl. + 14° 38′

1910.482	79°.1	14″.87
10.487	78.5	14.88
10.493	78.6	14.87
1910.487	78.7	14.87

Decided change due to proper motion.

8258 Hu 191

R.A. 17ʰ 52ᵐ 57ˢ Decl. − 13° 44′

1910.479	121°.7	4″.33
10.482	122.1	4.39
10.487	122.6	4.24
1910.483	122.1	4.32

No evidence of change.

8259 Ho 73

R.A. 17ʰ 52ᵐ 58ˢ Decl. + 35° 42′

1911.498	210°.5	1″.91
11.566	213.5	2.15
11.577	209.4	2.03
1911.547	211.1	2.03

The measures are somewhat erratic. There is probably no change.

8261 Ho 424

R.A. 17ʰ 53ᵐ 1ˢ Decl. + 28° 16′

1912.568	201°.7	1″.31
12.675	201.4	1.57
12.686	201.0	1.47
1912.643	201.4	1.45

Indication of increasing distance. More measures are needed.

.... SD − 15° (4760) (9.4 ... 12.0)

R.A. 17h 53m 9s Decl. − 15° 13′

1908.644	23°.2	13″.10	40
08.660	23.1	13.25	40
1908.652	23.2	13.17	

There is another star (12.0) *sp* at slightly greater distance.

8266 Hu 753

R.A. 17h 53m 18s Decl. − 11° 32′

1910.523	128°.4	5″.40
10.529	125.2	5.64
10.545	128.8	5.55
1910.532	127.5	5.53

No evidence of motion.

.... SD − 15° (4765) (9.5 ... 10.4)

R.A. 17h 53m 38s Decl. − 15° 21′

1908.636	11°.2	20″.88	12
08.638	9.6	20.70	12
1908.637	10.4	20.79	

8271 Hu 235

R.A. 17h 53m 41s Decl. + 45° 52′

1911.736	259°.9	1″.74
11.823	263.9	1.32
12.116	262.8	1.77
13.447	262.4	1.63
1912.280	262.2	1.61

Apparently no change.

.... Anon. (10.2 ... 12.0)

R.A. 17h 53m 49s Decl. − 15° 6′

1908.644	317°.4	12″.83	40
08.660	315.7	13.14	40
1908.652	316.5	12.98	

1s *p* and 189″ *s* of SD − 15° (4768).

.... CPD − 27° (5970) (9.2 ... 11.2)

R.A. 17h 54m 3s Decl. − 27° 40′

1912.352	85°.4	6″.43
15.528	84.3	6.46
1913.940	84.8	6.44

The star is *sp* **8281** Cordoba = **8300** O. Stone 40.

.... SD − 15° (4775) (8.2 ... 11.5)

R.A. 17h 54m 25s Decl. − 15° 21′

1908.638	251°.8	31″.11	12
15.470	252.2	31.56	
1912.054	252.0	31.33	

Star (12.8) in 273°.1 : 25″.75.

8281 Cordoba = **8300** O. Stone 40

R.A. 17h 54m 30s Decl. − 27° 30′

1910.496	158°.3	3″.12
10.529	157.0	3.35
10.545	159.1	3.31
1910.523	158.1	3.26

No change.

.... SD − 15° (4777) (9.0 ... 10.7)

R.A. 17h 54m 30s Decl. − 15° 41′

1908.636	2°.5	23″.58	12
08.638	1.5	23.16	12
1908.637	2.0	23.37	

8283 Es 78

R.A. 17h 54m 35s Decl. + 51° 12′

1912.420	135°.5	6″.68
12.505	135.9	6.57
12.511	136.4	6.56
1912.479	135.9	6.60

Star (12.1) in 199° : 33″. This star is a close double, 1″ ±. Apparently no change.

13406 Hu 925

R.A. 17h 54m 38s Decl. + 32° 29′

1912.415	333°.4	1″.97(a)
12.420	325.3	2.02
12.480	330.8	1.99
12.502	328.8	1.96
1912.454	329.6	1.98

(a) Faint. Clouds.

As yet no change.

8288 β 47

R.A. $17^h\ 54^m\ 52^s$ Decl. − 10° 14′

1910.529	275°.3	1″.51
12.319	278.3	1.37
12.349	276.9	1.48
1911.732	276.8	1.45

Probably unchanged.

8289 O. Stone 39. CPD − 24° (6186)

R.A. $17^h\ 57^m\ 21^s$ Decl. − 24° 21′

1910.496	346°.6	3″.67
10.523	345.6	3.74
10.529	344.7	3.87
1910.516	345.6	3.76

Follows M 8.

1910.28	350°.6	3″.15	3n	Ol

[Olivier (*Bull. L. O.* 190)]

Probably unchanged.

8290 H 1309

R.A. $17^h\ 55^m\ 1^s$ Decl. + 25° 33′

1910.482	1°.1	6″.32
10.507	1.4	6.40
10.512	1.1	6.53
1910.500	1.2	6.42

The few measures are erratic but change is improbable.

8295 OΣ (App) 163

R.A. $17^h\ 55^m\ 22^s$ Decl. + 62° 37′

1911.700	220°.9	57″.67
11.708	40.9	57.67
11.717	220.8	57.62
1911.708	220.9	57.65

Change due to proper motion. β connects a third star to determine which star is moving.

8300 O. Stone 40

R.A. $17^h\ 54^m\ 30^s$ Decl. − 27° 30′

See **8281**.

.... SD − 15° (4784) (9.4 ... 9.7)

R.A. $17^h\ 55^m\ 38^s$ Decl. − 15° 17′

1908.638	62°.0	23″.58	12
15.470	243.7	23.86	
1912.054	242.8	23.72	

8303 Σ 2262. τ *Ophiuchi*

R.A. $17^h\ 56^m\ 33^s$ Decl. − 8° 11′

1911.566	259°.1	2″.20
11.602	259.6	2.08
11.604	259.4	2.15
1911.591	259.4	2.14

The increase in distance is apparently not yet arrested. There are many recent observations.

8305 A 35

R.A. $17^h\ 56^m\ 43^s$ Decl. − 2° 37′

1911.566	297°.1	1″.66
11.602	296.3	1.69
11.604	296.2	1.68
1911.591	296.5	1.68

The interval covered by observations is too short to show motion.

8306 β 1126

R.A. $17^h\ 56^m\ 53^s$ Decl. − 24° 15′

AB and C

1911.528	20°.8	3″.77
11.602	19.5	3.98
11.634	21.8	4.04
1911.588	20.7	3.93

On north edge of M 8. No change. A and B too poorly seen for reliable measures.

8312 H 5010

R.A. $17^h\ 57^m\ 15^s$ Decl. − 24° 20′

1911.528	347°.0	3″.64
11.539	346.0	3.53
11.596	346.6	3.70
1911.554	346.5	3.62

On the following edge of M 8.

8315 H 2817

R.A. $17^h\ 57^m\ 31^s$ Decl. $-19^\circ\ 36'$

1911.634	275°.7	13″.56
11.673	275.5	13.55
11.717	275.2	13.55
1911.675	275.5	13.55

Probably unchanged. Glasenapp gives the position as:

1890.51	274°.6	13″.08	2n

8316 Ho 564 (... 13.4)

R.A. $17^h\ 57^m\ 37^s$ Decl. $+26^\circ\ 22'$

1912.461	323°.9	34″.00(a)
12.686	323.5	35.10
12.768	322.2	34.95
13.447	322.6	35.02
1912.840	323.0	34.77

(a) Seeing poor. Difficult.

1908.43	324°.9	31″.49	3n	β

[β (*Carnegie Inst.* 168)]

β gives the proper motion as 0″.747 in 164°.

.... SD − 15° (4801) (9.3 ... 11.8)

R.A. $17^h\ 57^m\ 38^s$ Decl. $-15^\circ\ 5'$

1908.644	335°.9	12″.94	40
08.660	335.6	13.01	40
1908.652	335.7	12.97	

8321 Σ 2267

R.A. $17^h\ 57^m\ 48^s$ Decl. $+40^\circ\ 11'$

1912.366	244°.6	1″.19
12.412	244.2	1.12
12.415	245.2	1.06
1912.398	244.7	1.12

Very slow motion if any.

8322 Ho 77 (7.9 ... 11.5)

R.A. $17^h\ 57^m\ 49^s$ Decl. $+40^\circ\ 20'$

1912.366	308°.6	2″.49
12.412	310.1	2.19(a)
12.689	310.0	2.12
1912.489	309.6	2.27

(a) Seeing excellent.

No evidence of motion.

8326 Ho 565 (9.0 ... 9.1)

R.A. $17^h\ 58^m\ 21^s$ Decl. $+26^\circ\ 4'$

1912.412	64°.9	0″.38
12.612	65.5	0.35
12.730	66.7	0.38
1912.585	65.7	0.37

Apparently fixed.

8327 H 2266

R.A. $17^h\ 58^m\ 23^s$ Decl. $+3^\circ\ 29'$

A and B

1911.525	182°.8	8″.79
11.528	182.4	8.79
11.539	182.8	8.79
1911.531	182.7	8.79

Unaltered.

A and C (10.3)

1911.525	200°.7	60″.61
11.528	200.7	60.68
11.539	200.9	60.73
1911.531	200.8	60.67

There are nearer, fainter stars.

8330 Σ 2269

R.A. $17^h\ 58^m\ 43^s$ Decl. $+14^\circ\ 47'$

1911.552	163°.0	21″.46
11.566	163.3	21.56
11.596	163.3	21.70
1911.571	163.2	21.57

Increase in distance is certain.

8336 H 1312

R.A. $17^h\ 59^m\ 15^s$ Decl. $+13^\circ\ 33'$

1911.552	61°.0	20″.95
11.566	60.5	21.06
11.596	60.9	20.98
1911.571	60.8	21.00

There are no early measures. Not in BD. Precedes BD 13° (3513).

8340 Σ 2272. 70 *Ophiuchi*

R.A. $17^h\ 59^m\ 23^s$ Decl. + 2° 33′

1911.525	152°3	4″10
11.539	152.7	4.05
11.552	145.1	4.16
11.566	145.8	4.14
11.596	145.5	4.38
11.604	149.0	3.93
1911.564	148.4	4.13

This star has now completed a full revolution since the first measures. There are a multitude of recent observations.

8344 OΣ 534

R.A. $17^h\ 59^m\ 54^s$ Decl. + 21° 26′

1911.437	271°9	2″18
11.500	269.7	2.30
11.552	272.2	2.20
1911.496	271.3	2.23

No evidence of motion.

8353 OΣ 341

R.A. $18^h\ 0^m\ 44^s$ Decl. + 21° 26′

1910.359	88°2	0″47(a)
10.383	93.0	0.45(a)
10.473	96.1	0.42
11.476	93.8	0.46
1910.673	92.8	0.45

(a) Very thick. Fog.

A very interesting system.

.... Roe 1. BD 41° (2968) (6.3 ... 11.5)

R.A. $18^h\ 1^m\ 16^s$ Decl. + 41° 56′

1908.876	187°0	22″09	12
09.766	187.5	22.32	
1909.321	187.2	22.20	

8362 A. G. 216

R.A. $18^h\ 1^m\ 43^s$ Decl. + 3° 16′

1912.568	88°8	2″49		
12.576	87.0	2.46		
12.579	89.0	2.54		
1912.574	88.3	2.50		
1907.36	89°9	1″47	3n	Doo
1908.51	91.7	2.48	2n	Bowyer

[Doolittle (*Pub. Flower Obsy.* IV) . . . Bowyer (*Greenwich Obsns.* 1908)]

The measures of distance are unaccountably discordant.

8368 β 826

R.A. $18^h\ 2^m\ 5^s$ Decl. + 9° 45′

1911.634	329°5	0″79
12.412	334.1	0.89
12.686	329.3	0.85
1912.244	331.0	0.84

Apparently fixed.

8372 A. Clark 15. 99 *Herculis*

R.A. $18^h\ 2^m\ 28^s$ Decl. + 30° 33′

1912.582	339°7	1″85
12.612	342.1	1.52
12.686	340.4	1.45
12.691	340.2	1.65
1912.643	340.6	1.62

The first revolution is now nearly complete.

8375 Σ 2282. *Herculis* 414

R.A. $18^h\ 2^m\ 38^s$ Decl. + 40° 21′

1912.390	84°2	2″80
12.412	88.9	2.64(a)
12.415	90.1	2.70
12.689	86.9	2.64
1912.476	87.5	2.69

(a) Seeing excellent.

Little if any change.

8379 Hu 314

R.A. $18^h\ 3^m\ 14^s$ Decl. + 18° 37′

1911.476	144°2	0″36(a)
11.651	318.7	0.28(b)
1911.563	141.4	0.32

(a) Very difficult. Thick. (b) Quadrant uncertain. Seeing scarcely good enough.

Hussey's original observations give:

1901.50	146°6	0″35	3n

8380 Σ 2281. 73 *Ophiuchi*

R.A. $18^h\ 3^m\ 36^s$ Decl. + 3° 58′

1912.478	88°9	0″41
12.480	85.6	0.36
12.691	86.1	0.39
1912.550	86.9	0.39

Aitken's recent measures are in accord in placing B in the first quadrant. A very interesting pair.

8384 Σ 2283

RA. 18^{h} 3^{m} 43^{s} Decl. + 6° 8′

1910.397	80°5	0″92
10.403	79.5	0.91
10.444	79.5	0.92
1910.415	79.8	0.92

Retrograde motion.

.... BD 3° (3619) (8.6 ... 8.8)

R.A. 18^{h} 4^{m} 35^{s} Decl. + 3° 47′

1912.568	77°1	6″00
12.576	76.5	5.94
12.579	76.8	5.97
1912.574	76.8	5.97

This pair is *nf* **8362** = A. G. 216.

8399 A 237

R.A. 18^{h} 4^{m} 54^{s} Decl. + 31° 43′

1912.472	101°1	2″37
12.582	100.8	2.43
12.612	97.6	2.43
1912.555	99.8	2.41

1908.43 96°7 1″90 3n Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

The distance may have increased.

8401 Hu 316

R.A. 18^{h} 5^{m} 4^{s} Decl. + 18° 15′

1910.496	155°9	1″72
10.509	156.3	1.68
10.523	155.9	1.78
1910.509	156.0	1.73

Fixed.

8408 Hu 317

R.A. 18^{h} 6^{m} 1^{s} Decl. + 17° 12′

1910.274	19°9	1″93
10.282	198.6	2.14
10.351	18.0	1.97(a)
1910.302	18.8	2.01

(a) Quadrant uncertain.

No evidence of motion.

8410 A 83

R.A. 18^{h} 6^{m} 17^{s} Decl. − 3° 31′

1910.403	315°3	0″80
10.473	313.9	0.80
10.496	314.8	0.79
1910.457	314.7	0.80

The increase in angle suggested by Doolittle is not substantiated.

8416 Hu 674

R.A. 18^{h} 6^{m} 45^{s} Decl. + 50° 23′

1910.367	272°6	0″49
12.412	266.7	0.51
12.478	264.9	0.49(a)
1911.752	268.1	0.50

(a) Seeing very good.

1908.24 273°6 0″65 3n Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Decrease in angle is indicated.

8418 OΣ 345

R.A. 18^{h} 6^{m} 57^{s} Decl. + 5° 48′

1910.383	60°2	1″34
10.403	63.3	1.41
10.444	62.2	1.35
1910.410	61.9	1.37

No evidence of motion.

8428 Σ 2295 (8.4 ... 10.5)

R.A. 18^{h} 8^{m} 4^{s} Decl. + 31° 33′

1910.274	170°3	10″49(a)
10.326	172.2	10.24
10.460	171.0	10.43
12.472	170.6	10.36
1910.883	171.0	10.38

(a) Colors: yellow and blue.

The distance seems to have decreased slightly.

8435 H 2824

R.A. 18^{h} 8^{m} 27 Decl. − 16° 51′

1910.427	74°3	23″18
10.430	73.8	23.08
10.441	74.2	23.02
10.460	74.4	23.27
1910.439	74.2	23.14

1911.19 74°5 22″47 3n Woods

[Woods (*A. J.* 644)]

There are no early measures.

8436 A 84

R.A. $18^h\ 8^m\ 32^s$ Decl. − 2° 33′

1910.274	315°.5	3″.99
10.282	315.5	4.04
10.340	314.4	4.10
1910.299	315.1	4.04

Probably unchanged.

.... SD − 17° (5092) (9.0 ... 11.0)

R.A. $18^h\ 8^m\ 47^s$ Decl. − 17° 0′

1910.430	323°.1	5″.08
10.460	324.1	5.12
10.479	325.1	5.34
1910.456	324.1	5.18

sf **8435** = H 2824.

.... SD − 17° (5095) (9.6 ... 11.5)

R.A. $18^h\ 8^m\ 59^s$ Decl. − 17° 9′

1910.430	43°.6	6″.51
10.460	42.7	6.41
10.479	41.0	6.53
1910.456	42.4	6.48

sf **8435** = H 2824.

8458 β 463 = Hn 143

R.A. $18^h\ 10^m\ 44^s$ Decl. − 16° 54′

1910.722	104°.7	2″.02
10.739	103.2	2.09
11.462	104.0	1.97
1910.974	104.0	2.03

1903.64	101°.5	1″.96	2n	D
1905.48	104.9	1.71	3n	Doo
1911.40	91.3	1.71	1n	Jonck
1911.40	94.0	1.92	1n	Voûte

[Dinwiddie (*Wash. Obsns.* II Vol. VI) . . . Doolittle (*Pub. Flower Obsy.* IV) . . . Jonckheere, Voûte (*M. N.* LXXII, 156)]

No evidence of motion.

8478 Hu 61

R.A. $18^h\ 12^m\ 45^s$ Decl. − 14° 50′

1910.326	115°.6	2″.15
10.378	114.9	2.08
10.400	116.7	2.27
1910.368	115.7	2.17

Without motion.

8490 Perrine

R.A. $18^h\ 14^m\ 14^s$ Decl. + 14° 0′

A and B

1910.274	359°.3	3″.40
10.282	359.9	3.31
10.340	359.5	3.34
10.353	358.8	3.29
1910.312	359.4	3.34

Probably unchanged.

A and C

1910.274	359°.0	52″.18
10.340	359.0	52.24
1910.307	359.0	52.21

No prior measures of C.

.... SD − 15° (4941)

R.A. $18^h\ 14^m\ 37^s$ Decl. − 15° 5′

1908.613	149°.5	19″.96	12
08.633	149.9	20.33	12
08.655	149.4	19.65	12
1908.634	149.6	19.98	

8502 Δ 18

R.A. $18^h\ 15^m\ 22^s$ Decl. − 15° 9′

B and C

1908.616	65°.3	1″.01	40
08.633	58.0	0.68	12
08.660	60.3	0.73	40
10.473	65.1	0.88	
10.509	67.3	0.95	
10.717	62.0	0.92	
11.602	62.3	0.92	
1909.887	62.9	0.87	

No evidence of change.

A and BC = Σ 2306

1908.616	219°.0	11″.38	40
08.633	219.1	11.34	12
08.655	218.5	11.41	12
08.660	219.5	11.51	40
10.274	218.6	11.50	
10.473	219.4	11.35	
10.509	218.8	11.52	
1909.403	219.0	11.43	

These measures made with three different instruments are consistent in showing a decrease in distance.

8512 Σ 2311

R.A. $18^h\ 16^m\ 38^s$ Decl. + 11° 23′

1910.326	152°.1	5″.27
10.353	151.8	5.54
10.378	152.2	5.31
1910.352	152.0	5.37

β (*Carnegie Inst.* 168) gives for the proper motion: 0″.047 in 193°.3.

8515 Hu 238

R.A. $18^h\ 16^m\ 43^s$ Decl. + 9° 54′

1911.424	160°.9	1″.01
11.495	162.3	0.80(a)
11.514	160.2	0.97
1911.478	161.1	0.93

(a) Seeing unsatisfactory.

As yet no motion.

8516 A. G. 222

R.A. $18^h\ 16^m\ 44^s$ Decl. + 14° 10′

1910.326	144°.3	1″.80
10.476	141.1	1.94
10.479	145.7	1.80
1910.427	143.7	1.85

Without change.

8525 H 1322. BD 27° (3006)

R.A. $18^h\ 18^m\ 1^s$ Decl. + 27° 37′

1912.467	242°.3	19″.50
12.472	242.1	19.62
12.582	241.4	19.56(a)
1912.507	241.9	19.56

(a) Very thick. Faint.

No early observations. Ho 83, Ho 84, and Σ 2315 are *sf* in the same finder field.

8532 Hu 64

R.A. $18^h\ 18^m\ 26^s$ Decl. − 16° 34′

A and B

1910.482	7°.7	3″.98
10.512	8.6	4.38(a)
10.518	8.5	3.83
10.529	8.9	3.93
1910.510	8.4	4.03

(a) Seeing very bad.

No change since 1899.

A and C (11.5)

1910.482	29°.2	17″.59
10.518	29.0	17.11
10.529	28.8	17.30
1910.510	29.0	17.33

A and D (12.0) in 352° : 24″.9. No prior measures of C.

8534 Ho 83

R.A. $18^h\ 18^m\ 34^s$ Decl. + 27° 28′

1912.472	89°.2	0″.62
12.478	88.3	0.68
12.727	86.9	0.53(a)
1912.559	88.1	0.61

(a) Moon very bright.

Possibly some increase in distance.

.... Anon. (10.5 ... 10.5)

R.A. $18^h\ 18^m\ 40^s$ Decl. + 12° 38′

1910.482	288°.6	24″.35
10.518	287.8	23.97
10.529	287.7	24.32
1910.510	288.0	24.21

This pair is *sp* **8539** = H 1323, for which it was measured. It is 14^s *f* and 210″.5 *n* of BD 12° (3508).

8537 OΣ 347

R.A. $18^h\ 19^m\ 1^s$ Decl. + 7° 10′

1910.482	344°.5	3″.38
10.518	343.6	3.47
10.529	344.6	3.50
1910.510	344.2	3.45

Probably unchanged.

8539 H 1323. BD 12° (3515)

R.A. $18^h\ 19^m\ 28^s$ Decl. + 12° 49′

1910.512	281°.5	17″.57
10.518	283.4	16.90
10.529	282.6	16.87
1910.520	282.5	17.11

There are no early measures.

8545 Ho 84

R.A. 18^h 20^m 3^s Decl. + 27° 20′

1912.467	317°.4	4″.01
12.472	317.8	4.20
12.686	319.7	4.10
1912.542	318.3	4.10

The early measures by Hough make the distance less.

8547 Hu 239

R.A. 18^h 20^m 8^s Decl. − 21° 59′

1911.467	181°.1	3″.29
11.514	181.1	3.18
11.525	0.6	3.21
1911.502	180.9	3.23

No change.

8548 Σ 2315. *Herculis* 452

R.A. 18^h 20^m 12^s Decl. + 27° 20′

1912.478	179°.0	0″.30
12.730	183.5	0.32
1912.454	181.2	0.31

The measures of the next few years will be of great interest.

8549 β 133

R.A. 18^h 20^m 15^s Decl. − 26° 42′

1911.467	258°.3	1″.80
11.514	259.6	1.69
11.599	258.8	1.80
1911.527	258.9	1.76

Possibly some decrease in the angle.

8554 A 580

R.A. 18^h 20^m 41^s Decl. + 7° 37′

1910.545	320°.5	4″.42
10.551	322.6	4.56
10.562	322.4	4.33
1910.553	321.8	4.44

No change.

8558 Hu 240

R.A. 18^h 20^m 48^s Decl. − 21° 40′

1911.424	35°.7	4″.69
11.514	34.3	4.70
11.530	33.5	4.69
1911.489	34.5	4.69

Very similar to **8566**. As yet no motion.

8559 A 86

R.A. 18^h 20^m 57^s Decl. − 6° 21′

1911.552	289°.1	2″.83
11.599	288.8	2.92
11.602	288.4	2.75
1911.584	288.8	2.83

Unaltered.

8560 Espin —

R.A. 18^h 20^m 57^s Decl. + 51° 36′

A and B

1911.700	202°.6	2″.60
11.708	202.7	2.67
11.717	202.6	2.54
1911.708	202.6	2.60

No relative motion.

A and C

1911.700	119°.0	86″.28
11.717	119.0	86.37
1911.708	119.0	86.32

There are no prior measures of C.

8562 Σ 2316. 59 *Serpentis*

R.A. 18^h 21^m 4^s Decl. + 0° 7′

1911.467	316°.3	4″.01
11.473	315.3	3.89
11.492	315.2	3.99
11.498	314.4	3.77
1911.482	315.3	3.92

Immobile.

8565 ♅N 125

R.A. 18^h 21^m 33^s Decl. − 25° 7′

1912.349	103°.6	3″.13
12.352	103.0	3.19
12.366	102.4	3.12
1912.356	103.0	3.15

Equal magnitudes.

1908.726	101°.0	2″.78	2n	Ol
1908.726	103.0	2.56	2n	Neff

[Olivier, Neff (*A. N.* 4360)]

Probably unchanged.

8566 Hu 241

R.A. 18^h 21^m 40^s Decl. − 21° 27′

A and B

1911.424	34°.2	4″.24
11.514	33.2	4.21
11.530	33.0	4.29
1911.489	33.5	4.25

Very similar to **8558**. No change.

A and C

1911.424	301°.2	63″.14
11.530	300.9	62.92
1911.477	301.0	63.03

No previous observations of C.

8571 β 134 = OΣ 543

R.A. 18^h 21^m 59^s Decl. + 46° 49′

1912.502	131°.0	1″.17
12.505	128.2	1.18
12.508	128.8	1.22
1912.505	129.3	1.19

Entirely fixed.

8575 Hu 66

R.A. 18^h 22^m 11^s Decl. + 48° 42′

A and B

1912.412	298°.4	0″.26
12.480	296.5	0.31
12.730	295.3	0.32
1912.541	296.7	0.30

AB and C = OΣ 351

1912.412	19°.6	0″.68
12.480	21.1	0.65
12.730	17.1	0.66
1912.541	19.3	0.66

Change is uncertain. See Doolittle (*Pub. Flower Obsy*. IV).

8588 OΣ 352 *rej.*

R.A. 18^h 23^m 6^s Decl. + 46° 44′

1912.505	222°.1	24″.29(a)
12.508	222.0	24.23
13.463	221.4	24.46
1912.825	221.8	24.33

(a) Several faint stars nearer.
Entirely fixed.

8584 Σ 2320. *Herculis* 457

R.A. 18^h 22^m 50^s Decl. + 24° 37′

1911.437	1°.6	1″.65
11.498	2.2	1.54
11.503	5.1	1.53
11.506	6.6	1.50
11.626	5.0	1.57
1911.514	4.1	1.56

No appreciable motion.

8589 Hu 68

R.A. 18^h 23^m 11^s Decl. − 12° 20′

1911.552	120°.9	3″.18
11.599	121.7	3.19
11.602	120.9	3.01
1911.584	121.2	3.13

Unaltered.

8591 Hu 320

R.A. 18^h 23^m 17^s Decl. + 16° 9′

1911.424	143°.7	2″.15
11.437	140.6	1.99
11.498	145.3	1.97
1911.453	143.2	2.04

Unchanged.

.... SD − 15° (4995) (9.1 ... 9.1)

R.A. $18^h\ 24^m\ 4^s$ Decl. − 15° 1′

1908.604	7°8	8″42	40
08.613	187.6	8.45	12
08.616	187.7	8.43	40
1908.611	187.7	8.43	

Found with the 12-inch.

8619 β 419

R.A. $18^h\ 25^m\ 42^s$ Decl. − 7° 55′

1912.579	45°3	1″18
12.727	44.3	1.11
12.732	43.8	1.12
1912.679	44.5	1.14

1905.45	50°5	1″32	6n	Doo
1906.15	46.6	1.20	4n	Ol
1907.74	47.3	1.28	2n	Wil

[Doolittle (*Pub. Flower Obsy.* IV) . . . Olivier, Wilson (*A. N.* 4227)]

The angle is less than in the earlier measures.

8629 Hu 321. BD 23° (3357) (9.1 ... 10.5)

R.A. $18^h\ 26^m\ 42^s$ Decl. + 23° 5′

1912.434	350°9	5″56
12.762	352.3	5.67
12.768	352.9	5.54
1912.655	352.0	5.59

1910.16	350°3	5″63	3n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

Both angle and distance show decided increase.

8633 Hu 245

R.A. $18^h\ 27^m\ 12^s$ Decl. + 11° 42′

1911.525	48°9	2″12
11.528	49.9	2.20
11.530	54.0	2.11
11.533	50.1	2.17
1911.529	50.7	2.15

As yet no motion.

8650 OΣ 356 *rej.*

R.A. $18^h\ 29^m\ 20^s$ Decl. + 40° 4′

A and B

1911.626	305°6	35″41
11.670	305.5	35.50
11.700	305.4	35.30
1911.665	305.5	35.40

A and C

1911.626	4°4	51″94
11.700	4.7	52.00
1911.663	4.5	51.97

Change in both AB and AC due to proper motion of A. Given by β (*Carnegie Inst.* 168) as 0″063 in 316°2.

8657 A 354

R.A. $18^h\ 30^m\ 8^s$ Decl. + 5° 1′

1912.319	7°6	4″53
12.349	7.6	4.56(a)
12.352	6.7	4.60
1912.340	7.3	4.56

(a) B faint. Dawn.

As yet no motion.

8659 OΣ 357

R.A. $18^h\ 30^m\ 21^s$ Decl. + 11° 38′

1912.412	224°5	0″33(a)
15.596	233.3	0.33
1914.004	228.9	0.33

(a) Dawn.

These measures indicate decided retrograde motion.

8660 Σ 2345

R.A. $18^h\ 30^m\ 23^s$ Decl. + 20° 59′

1912.319	205°5	9″10
12.396	205.7	8.89
12.415	205.6	8.92
1912.377	205.6	8.97

Direct motion with increasing distance. Ascribing the change to proper motion, β (*Carnegie Inst.* 168) gets 0″043 in 80°2.

8663 OΣ 358

R.A. $18^h\ 30^m\ 32^s$ Decl. + 16° 53′

1912.415	186°7	2″12
12.426	5.0	2.29
12.437	187.0	2.29
1912.426	186.2	2.23

1905.53	191°4	2″01	3n	Lau
1905.56	189.1	1.85	3n	Doo
1908.52	188.0	1.96	3n	Doo
1908.54	190.9	1.96	5n	Do
1908.56	189.9	1.84	3n	Bies

[Lau (*A. N.* 4111) . . . Doolittle (*Pub. Flower Obsy.* IV) . . . Do (*A. N.* 4328) . . . Van Biesbroeck (*Ann. Observ. Belgique*, N. S. XIII)]

8673 Σ 2346

R.A. $18^{h}\ 31^{m}\ 27^{s}$ Decl. $+7^{\circ}\ 26'$

1912.319	292°.2	22″.04
12.352	293.2	22.02
12.396	292.1	22.01
1912.356	292.5	22.02

Increase in angle and distance due to proper motion.

8684 Σ 2451 = Sh 271

R.A. $18^{h}\ 32^{m}\ 22^{s}$ Decl. $+41^{\circ}\ 11'$

1907.485	338°.4	5″.85	12
07.701	338.9	5.30	12
07.711	338.9	5.21	12
1907.632	338.7	5.45	

Entirely fixed.

8697 Hu 248

R.A. $18^{h}\ 33^{m}\ 9^{s}$ Decl. $+9^{\circ}\ 2'$

1912.349	112°.6	2″.08
12.352	293.7	1.93
12.366	112.9	2.02
1912.356	113.1	2.01

In the twelve years since discovery there has been no change.

8700 Σ 2366 *rej.*

R.A. $18^{h}\ 33^{m}\ 33^{s}$ Decl. $+69^{\circ}\ 51'$

1912.516	334°.2	29″.72
12.615	333.4	29.80
12.669	332.8	29.83(a)
1912.600	333.5	29.78

(a) Star (13.0) in 257° : 10″.5. No change.

8706 Miller

R.A. $18^{h}\ 34^{m}\ 1^{s}$ Decl. $+15^{\circ}\ 33'$

1912.349	62°.1	3″.50
12.352	63.2	3.46
12.366	62.6	3.37
1912.356	62.6	3.44

No evidence of motion.

8708 A. G. 224

R.A. $18^{h}\ 34^{m}\ 5^{s}$ Decl. $+3^{\circ}\ 15'$

1912.434	348°.1	22″.25
12.437	348.1	22.22
12.500	347.7	22.29
1912.457	348.0	22.25

1909.58	348°.3	22″.35	2n	Lau
1910.60	349.3	22.51	4n	Do

Lau (*A. N.* 4379) . . . Do (*A. N.* 4480)]

Recent measures make the distance somewhat larger. Probably no change.

8717 β 1328

R.A. $18^{h}\ 34^{m}\ 57^{s}$ Decl. $+2^{\circ}\ 55'$

1912.396	285°.5	2″.05
12.415	284.4	2.14
12.426	283.2	2.12
12.483	282.1	2.15
1912.430	283.8	2.11

Probably unchanged.

8720 A 586

R.A. $18^{h}\ 35^{m}\ 3^{s}$ Decl. $+40^{\circ}\ 36'$

1912.502	202°.4	2″.24
12.505	205.2	2.20
12.508	204.2	2.24
12.511	202.9	2.06
1912.506	203.7	2.18

The diminution in angle noted by Doolittle is not verified.

8721 Σ 2364

R.A. $18^{h}\ 35^{m}\ 9^{s}$ Decl. $+24^{\circ}\ 36'$

1912.434	176°.1	8″.38
12.500	176.1	8.33
12.568	175.9	8.38
1912.501	176.0	8.36

Retrograde motion with increase in distance.

8729 A. G. 225

R.A. $18^{h}\ 35^{m}\ 52^{s}$ Decl. $+40^{\circ}\ 28'$

1912.502	356°.5	6″.63
12.505	356.8	6.62
12.508	356.0	6.54
1912.505	356.4	6.60

Unaltered.

8751 Σ 2369

R.A. $18^{h}\ 37^{m}\ 54^{s}$ Decl. + 2° 30′

1912.366	91°.2	1″.02
12.415	91.0	1.10
12.576	....	0.98(a)
12.579	90.4	0.99
1912.484	90.9	1.02

(a) Clouds.

1908.58	94°.3	1″.07	3n	Do
1908.72	95.2	0.76	1n	Furner
1909.52	85.4	0.94	3n	Doo

[Doberck (*A. N.* 4328) . . . Furner (*Greenwich Obsns.* 1908) . . . Doolittle (*Pub. Flower Obsy.* IV)]

This will eventually be a close pair.

8764 Ho 88. SD − 9° (4828)

R.A. $18^{h}\ 39^{m}\ 26^{s}$ Decl. − 9° 36′

1912.579	28°.4	2″.31
12.615	27.6	2.33
12.667	27.2	2.40
1912.620	27.7	2.35

Probably unchanged.

8776 Σ 2375

R.A. $18^{h}\ 39^{m}\ 34^{s}$ Decl. + 5° 22′

1908.392	114°.2	2″.45	40
08.465	114.8	2.43	12
08.487	113.9	....	40
08.553	113.6	2.41	12
08.520	113.4	2.44	12
1908.483	114.0	2.43	

Little if any change.

8783 Σ 2382. ε¹ 4 *Lyrae*

R.A. $18^{h}\ 40^{m}\ 22^{s}$ Decl. + 39° 33′

1907.485	10°.4	3″.21	12
07.701	10.9	3.19	12
07.711	9.0	3.42	12
13.179	13.5	3.00	
13.206	12.8	3.15	
13.261	12.2	3.19	
1907.632	10.1	3.27	
1913.215	12.8	3.11	

A of **8783** to A of **8785**

1913.179	172°.7	207″.47
13.206	172.8	207.76
13.261	172.4	207.70
1913.215	172.6	207.64

8785 Σ 2383. ε² 5 *Lyrae*

R.A. $18^{h}\ 40^{m}\ 24^{s}$ Decl. + 39° 29′

1907.485	124°.1	2″.39	12
07.701	122.0	2.74	12
07.711	122.4	2.71	12
13.179	120.6	2.69	
13.206	120.0	2.55	
13.261	120.6	2.88	
1907.632	122.8	2.61	
1913.215	120.4	2.71	

8790 Σ 2386 *rej.*

R.A. $18^{h}\ 40^{m}\ 58^{s}$ Decl. + 35° 25′

A and B

1912.582	20°.1	21″.58
12.615	20.2	21.71
12.678	20.7	21.65
1912.625	20.3	21.65

The distance is increasing.

A and C

1912.615	78°.9	56″.02
12.678	79.1	56.01
1912.646	79.0	56.01

No prior measures of C.

8792 Σ 2393

R.A. $18^{h}\ 41^{m}\ 6^{s}$ Decl. + 38° 11′

1912.582	23°.3	13″.92
12.615	22.4	13.99
12.678	22.2	13.88
1912.625	22.6	13.93

Increasing distance due to proper motion.

8798 Σ 2398

R.A. 18h 41m 34s Decl. + 59° 25′

A and B

1912.689	151°6	17″30
12.691	151.4	17.26
12.754	151.7	17.29
1912.711	151.6	17.28

There is no dearth of observations of this interesting pair.

A and C (10.9)

1912.689	221°6	51″60
12.691	221.9	51.64
12.754	222.4	51.73
1912.711	222.0	51.66

Rapid retrograde motion with increasing distance due to the large proper motion of A.

8814 Es —

R.A. 18h 42m 24s Decl. + 60° 32′

1912.689	108°0	3″32
12.691	106.0	3.68
12.754	107.0	3.29
1912.711	107.0	3.43

Espin's description is:

1903 103°6 4″3

8819 OΣ 362

R.A. 18h 42m 34s Decl. + 10° 31′

1912.582	338°7	7″69
12.615	339.1	7.95
12.639	339.1	7.95(a)
1912.612	339.0	7.86

(a) B very faint. Moon and poor seeing.
Entirely fixed.

8822 Σ 2397

R.A. 18h 42m 39s Decl. + 31° 16′

1912.582	266°6	3″98
12.615	267.1	3.99(a)
12.667	266.0	3.81(b)
1912.621	266.6	3.93

(a) Clouds. (b) Seeing very poor.
Entirely fixed.

8823 Howe 44 = Hn 147

R.A. 18h 42m 49s Decl. − 17° 2′

1910.433	295°9	1″89
10.444	295.2	1.84
10.717	297.6	1.97
1910.531	296.2	1.90

Transferred from the Holden list. No other recent measures. Fixed.

8824 Σ 2396

R.A. 18h 42m 49s Decl. + 10° 38′

1912.615	326°6	35″66
12.639	326.8	35.90
12.691	327.1	35.75
1912.648	326.8	35.77

Well-known proper motion.

.... Anon. (10.1 ... 10.6)

R.A. 18h 44m 1s Decl. − 8° 4′

A and C

1913.573	88°5	9″91
13.573	89.5	9.75
13.592	88.9	9.88
1913.579	89.0	9.85

A and B (12.8)

1913.592	319°4	5″42
14.482	313.6	5.30
14.493	317.7	5.91
1914.189	316.9	5.54

This group is *np* **8846** = β 970. Midway between SD − 8° (4726) and (4729).

8844 Σ 2402

R.A. 18h 44m 5s Decl. + 10° 32′

1912.615	203°9	1″22
12.691	202.6	1.25
12.727	201.8	1.20
1912.678	202.8	1.22

1902.68 203°3 0″91 1n A
[Aitken (*Pub. L. O.* XII)]

The measures are erratic. Change is doubtful.

8860 Σ 2404. *Tauri Pon.* 78

R.A. 18ʰ 45ᵐ 7ˢ Decl. + 10° 50′

1908.392	179°.7	3″.83	40
08.465	181.5	3.87	12
08.487	179.7	3.65	40
12.582	178.9	3.98	
12.615	179.6	3.89	
12.639	180.3	3.89	
1910.530	179.8	3.85	

No significant change.

8875 Es 127

R.A. 18ʰ 46ᵐ 12ˢ Decl. + 62° 46′

1912.689	141°.7	4″.99
12.691	142.9	4.99
12.754	143.6	5.05
1912.711	142.7	5.01

Espin's description is:

1902	135°.7	4″.7	9.5 ... 9.5

9015 Σ 2445

R.A. 18ʰ 59ᵐ 35ˢ Decl. + 23° 9′

1908.392	262°.5	12″.33	40
08.564	262.7	12.48	40
08.604	263.4	12.49	40
1908.520	262.9	12.43	

Entirely fixed.

9028 Σ 2449

R.A. 19ʰ 0ᵐ 33ˢ Decl. + 6° 58′

1908.465	290°.7	8″.17	12
08.553	290.8	8.07	12
08.564	291.0	8.09	40
1908.527	290.8	8.11	

Fixed.

9029 Dawes 9

R.A. 19ʰ 0ᵐ 35ˢ Decl. + 43° 42′

1908.564	177°.2	1″.96	40
08.604	180.3	2.12	40
08.613	178.3	1.75	12
1908.594	178.7	1.94	

Fixed.

9034 H 2854

R.A. 19ʰ 1ᵐ 5ˢ Decl. + 8° 36′

1909.312	50°.6	8″.07	40	
09.331	50.7	8.14	40	
09.367	51.2	8.00	40	
1909.337	50.8	8.07		
1911.44	47°.6	8″.55	3n	Woods

[Woods (*A. J.* 644)]

Retrograde motion with increasing distance.

C and D (13.2 ... 14.0)

1909.331	212°.2	11″.56	40
09.367	209.2	11.76	40
1909.349	210.7	11.66	

In field with H 2854.

9053 Σ 2461. 17 *Lyrae*

R.A. 19ʰ 2ᵐ 53ˢ Decl. + 32° 19′

A and B

1907.581	306°.3	3″.98	12
07.638	312.7	4.04	12
07.692	312.7	3.68	12
13.283	313.3	3.89	
13.294	313.4	3.68	
13.326	313.8	3.81	
13.332	313.4	3.90	
1907.637	310.6	3.90	
1913.309	313.5	3.82	

A and C

1907.581	66°.6	130″.10	12
07.638	66.3	130.71	12
07.692	66.3	130.93	12
13.294	64.5	138.96	
13.326	64.5	139.07	
13.332	64.6	139.12	
1907.637	66.4	130.58	
1913.317	64.5	139.05	

A and D

1907.581	295°.2	126″.42	12
07.638	295.7	126.61	12
07.692	295.7	127.07	12
13.294	295.3	127.21	
13.326	295.4	126.85	
13.332	295.5	126.93	
1907.637	295.5	126.70	
1913.317	295.4	127.00	

A and E

1907.581	116°.3	151″.41	12
07.638	117.0	150.94	12
07.692	117.0	151.41	12
13.294	116.6	149.96	
13.326	116.4	150.03	
13.332	116.7	150.15	
1907.637	116.8	151.25	
1913.317	116.6	150.05	

A and F

1907.581	357°.0	167″.23	12
07.638	356.7	168.49	12
07.692	356.7	168.00	12
13.294	356.6	167.53	
13.326	356.6	167.69	
13.332	356.6	167.65	
1907.637	356.8	167.91	
1913.317	356.6	167.62	

C and E

1913.294	176°.3	127″.19
13.332	176.2	127.31
13.335	176.2	127.22
1913.320	176.2	127.24

C and G

1913.294	123°.4	128″.44
13.335	123.3	129.03
13.485	123.4	128.40
1913.371	123.4	128.62

Burnham in *Carnegie Inst.* 168 has given a full discussion of the motion in this system and especially of the remarkable motion of the faint star C. For this star Slocum derives a parallax of 0″.124. (*Ap. J.* **38,** 18)

9054 Σ 2478

R.A. $19^{h}\ 3^{m}\ 4^{s}$ Decl. + 69° 16′

1912.478	296°.1	1″.13
12.505	296.7	1.22
12.508	297.5	1.19
1912.497	296.8	1.18

No significant change.

9055 Σ 2465

R.A. $19^{h}\ 3^{m}\ 8^{s}$ Decl. + 30° 29′

1908.613	247°.4	0″.78	12
10.706	250.6	1.04	
11.470	248.2	1.18	
1910.263	248.7	1.00	

No evidence of motion.

..... SD − 15° (5255) (9.1 ... 11.5)

R.A. $19^{h}\ 3^{m}\ 20^{s}$ Decl. − 15° 25′

1908.698	308°.1	5″.39	40
08.717	307.9	5.46	40
15.509	307.5	5.43	
1910.975	307.8	5.43	

9061 Σ 2464

R.A. $19^{h}\ 3^{m}\ 36^{s}$ Decl. + 11° 41′

1911.634	22°.5	1″.34
11.651	21.2	1.33
11.656	22.4	1.28
1911.647	22.0	1.32

The change of angle suggested in β G. C. is not substantiated.

9070 Ho 571

R.A. $19^{h}\ 4^{m}\ 13^{s}$ Decl. + 30° 41′

1908.564	214°.4	11″.71	40
08.616	214.5	11.76	40
08.799	215.5	12.11	40
1908.660	214.8	11.86	

Change is not yet certain.

..... SD − 15° (5260) (9.7 ... 10.1)

R.A. $19^{h}\ 4^{m}\ 27^{s}$ Decl. − 15° 43′

1908.649	98°.7	14″.65	12
08.652	98.8	14.68	12
08.698	99.5	14.95	40
1908.666	99.0	14.76	

9085 Σ 2471

R.A. $19^h\ 5^m\ 10^s$ Decl. + 7° 56′

1909.312	124°.0	8″.40	40
09.540	.....	8.35	40
09.559	123.0	8.23	40
09.736	123.1	8.34	
1909.537	123.1	8.33	

Slow increase in distance.

9101 H 1373. SD − 18° (5254) (9.8 ... 10.6)

R.A. $19^h\ 6^m\ 23^s$ Decl. − 18° 15′

1910.482	241°.6	8″.99
10.733	241.4	8.90
11.492	241.6	8.80
1910.902	241.5	8.90

1912.56 241°.5 8″.77 3n Woods

[Woods (*A. J.* 644)]

The distance may be decreasing slowly.

..... SD − 15° (5278) (9.2 ... 12.0)

R.A. $19^h\ 6^m\ 47^s$ Decl. − 15° 38′

1908.698	355°.5	13″.61	40
08.717	352.6	13.60	40
1908.708	354.1	13.61	

9115 Cordoba

R.A. $19^h\ 7^m\ 11^s$ Decl. − 27° 31′

A and B

1911.530	325°.3	2″.27
11.602	325.8	2.37
11.629	325.3	2.52
1911.587	325.5	2.39

Perhaps some change in distance.

A and C

1911.530	54°.7	63″.03
11.602	55.3	63.00
1911.566	55.0	63.01

No prior measures.

9124 Σ 2482

R.A. $19^h\ 7^m\ 46^s$ Decl. + 18° 56′

1909.559	343°.1	1″.93	40
09.570	342.9	1.78	12
09.973	343.5	2.14	
1909.701	343.2	1.95	

Change is still uncertain.

9136 Σ 2484

R.A. $19^h\ 8^m\ 59^s$ Decl. + 18° 52′

1909.616	227°.5	2″.49	40
09.973	224.2	2.69	
09.975	223.9	2.85	
10.208	226.9	2.45	
10.397	228.3	2.48	
10.400	228.5	2.46	
1910.095	226.6	2.57	

Apparently unchanged.

9140 Σ 2485 *rej.*

R.A. $19^h\ 9^m\ 9^s$ Decl. + 22° 56′

1910.222	318°.3	8″.84
10.326	319.3	8.62
10.400	318.0	8.73
1910.316	318.5	8.73

Of this pair there are no observations prior to 1904.

9177 Σ 2490

R.A. $19^h\ 11^m\ 42^s$ Decl. − 3° 41′

1909.559	247°.9	3″.36	40
10.208	245.2	3.22	
10.375	247.0	3.38	
1910.047	246.7	3.32	

Fixed.

9204 Σ 2494 *rej.*

R.A. $19^h\ 13^m\ 36^s$ Decl. − 6° 51′

1909.540	81°.1	25″.95	40
09.559	81.4	25.65	40
09.570	81.8	25.59	12
1909.556	81.4	25.73	

The measures of this pair are not in good agreement. Probably unchanged.

9220 Ho 272

R.A. $19^h\ 14^m\ 46^s$ Decl. $-17°\ 28'$

1910.482	43°.5	8″.53
10.733	42.8	8.38
11.492	43.5	8.53
1910.902	43.3	8.48

The micrometric measures give for the proper motion:

0″.081 in 241°.0.

9251 Σ 2514

R.A. $19^h\ 16^m\ 49^s$ Decl. $+67°\ 28'$

1910.463	330°.6	11″.87
10.465	330.8	11.52
10.531	329.5	11.77
1910.486	330.3	11.72

From the micrometric observations β finds proper motion of 0″.121 in 191°.1. (*Carnegie Inst.* 168)

9279 Σ 2513

R.A. $19^h\ 19^m\ 8^s$ Decl. $+2°\ 13'$

1909.540	318°.3	2″.22	40
09.559	317.2	2.28	40
09.570	317.5	1.94	12
1909.556	317.7	2.15	

No evidence of change.

9304 H 1395

R.A. $19^h\ 20^m\ 52^s$ Decl. $+36°\ 53'$

A and B

1909.367	63°.9	2″.96	40
09.425	64.3	2.71	40
09.540	242.2	2.96	40
1909.444	63.5	2.88	

Fixed.

A and C (10.3)

1909.367	14°.2	55″.93	40
09.425	14.3	56.02	40
09.540	14.1	56.08	40
1909.444	14.2	56.01	

No previous observations of C.

9317 β 1286

R.A. $19^h\ 21^m\ 39^s$ Decl. $+35°\ 41'$

A and B

1908.838	100°.3	6″.33	12
09.331	101.7	6.28	40
09.367	100.4	6.49	40
1909.179	100.8	6.37	

Slow decrease in angle.

9319 Σ 2525

R.A. $19^h\ 21^m\ 40^s$ Decl. $+27°\ 5'$

1910.367	308°.2	0″.61
10.496	309.2	0.73
10.499	307.1	0.79
1910.454	308.2	0.71

A very interesting binary.

9323 Ho 106

R.A. $19^h\ 21^m\ 54^s$ Decl. $-3°\ 17'$

1911.599	219°.9	1″.30
11.602	221.2	1.16
11.604	220.4	1.14
1911.602	220.5	1.20

No change.

9341 β 424. BD 35° (3630)

R.A. $19^h\ 23^m\ 5^s$ Decl. $+35°\ 49'$

1908.799	35°.2	2″.92	40
08.838	35.3	2.75	12
09.331	35.7	2.70	40
09.367	39.0	2.89	40
1909.084	36.3	2.81	

No relative motion.

9365 Δ 20

R.A. $19^h\ 25^m\ 1^s$ Decl. $-2°\ 22'$

A and B

1911.602	67°.9	1″.40
11.604	67.3	1.29
11.621	66.3	1.31
1911.609	67.2	1.33

Apparently unchanged.

A and C = Σ 2535

1911.503	297°4	26″00
11.602	298.3	25.94
11.604	297.9	25.93
1911.570	297.9	25.96

The distance is probably slowly decreasing.

9381 Σ 2536

R.A. 19^{h} 26^{m} 16^{s} Decl. + 17° 32′

1912.579	74°0	2″00
12.582	74.4	1.87
12.612	71.1	1.99
1912.591	73.2	1.95

The character of motion is still uncertain.

9383 H 2877

R.A. 19^{h} 26^{m} 24^{s} Decl. − 27° 18′

1910.465	73°3	25″18
10.529	73.5	24.98
10.733	73.8	25.14
1910.576	73.5	25.10

The few measures of this pair are exceedingly erratic. Change is uncertain.

9386 H 5128

R.A. 19^{h} 26^{m} 36^{s} Decl. − 18° 52′

A and B

1910.460	112°4	21″03
11.665	111.2	21.03
11.670	111.2	21.13
11.673	111.1	21.04
1911.367	111.5	21.06

B and C

1910.460	125°6	4″39
11.665	126.6	4.72
11.670	127.1	4.47
11.673	126.5	4.50
1911.367	126.4	4.52

The stars maintain their relative positions unchanged.

9387 β 143

R.A. 19^{h} 26^{m} 39^{s} Decl. + 49° 15′

1910.468	191°0	2″49
10.476	190.7	2.36
10.493	192.6	2.15
1910.479	191.4	2.33

No evidence of motion.

9389 H 1411. BD 53° (2250) (9.4 … 9.8)

R.A. 19^{h} 27^{m} 10^{s} Decl. + 53° 48′

1910.463	93°0	13″70		
10.468	92.7	13.59		
10.531	92.4	13.49		
1910.487	92.7	13.59		
1907.82	93°5	13″24	2n	Bies

[Van Biesbroeck (*Ann. Observ. Belgique*, N. S. XIII)]

No early measures. The error in Van Biesbroeck's mean of his distances is here corrected.

9393 H 2880 = Ho 273

R.A. 19^{h} 27^{m} 5^{s} Decl. − 16° 32′

1910.460	146°9	4″29
10.465	146.1	4.48
10.473	149.9	3.98
10.482	147.9	4.14
1910.470	147.7	4.22

The distance is perhaps slowly increasing.

9397 Ho 107

R.A. 19^{h} 27^{m} 26^{s} Decl. − 0° 32′

A and B

1910.465	105°9	6″07
10.482	106.9	6.00
10.529	106.9	6.20
1910.492	106.6	6.09

Possibly some increase in distance.

A and C (11.8)

1910.465	187°1	25″21
10.482	188.1	25.17
10.529	187.4	25.32
1910.492	187.5	25.23

No change.

9399 OΣ 374 *rej.*

R.A. $19^h\ 27^m\ 51^s$ Decl. $+49°\ 57'$

1910.463	296°.6	18″.68
10.468	295.2	18.62
10.476	295.9	18.94
1910.469	295.9	18.75

No relative motion.

.... A 1398. BD 53° (2254) (8.5 ... 10.0)

R.A. $19^h\ 28^m\ 13^s$ Decl. $+53°\ 48'$

1910.559	59°.0	1″.32
11.541	58.8	1.50
11.566	59.4	1.34
1911.222	59.1	1.39

1906.51	56°.8	1″.40	3n	A

[Aitken (*Bull. L. O.* 109)]

Found in seeking the erroneously located Es 129.

9402 H 2881. SD − 19° (5535)

R.A. $19^h\ 31^m\ 13^s$ Decl. $-19°\ 16'$

1911.717	324°.4	5″.24
12.762	323.7	4.91
13.447	322.7	5.12
1912.642	323.6	5.09

There are no early measures. The catalogue identification leads to the new coördinates.

9415 OΣ 375

R.A. $19^h\ 29^m\ 16^s$ Decl. $+17°\ 52'$

1910.473	152°.5	0″.64
10.509	149.7	0.59
10.706	147.9	0.50
10.744	151.3	0.65
1910.608	150.4	0.60

Slow direct motion.

9422 A 105

R.A. $19^h\ 29^m\ 36^s$ Decl. $-3°\ 19'$

1911.599	335°.7	2″.75
11.602	335.1	2.60
11.604	336.5	2.80
1911.602	335.8	2.72

Aitken's measures give:

1900.48	335°.5	2″.34	3n

.... A 1399. BD 54° (2173) (9.4 ... 10.0)

R.A. $19^h\ 29^m\ 52^s$ Decl. $+54°\ 17'$

1911.577	78°.6	1″.45
11.634	80.9	1.47
12.511	78.1	1.54
1911.907	79.2	1.49

1906.51	79°.9	1″.35	3n	A

[Aitken (*Bull. L. O.* 109)]

Measured while seeking **9438** = Es 129.

9431 H 1418. BD 49° (3044)

R.A. $19^h\ 30^m\ 26^s$ Decl. $+49°\ 47'$

1910.493	10°.5	28″.45
10.562	11.0	28.64
10.895	10.7	28.55
1910.650	10.7	28.55

Faint stars in 310° ± from each of A and B. Herschel's description is:

1828 +	8°.1	25″ ±

9434 Σ 2541

R.A. $19^h\ 30^m\ 13^s$ Decl. $-10°\ 42'$

1910.482	328°.0	4″.45
10.493	327.6	4.41
10.496	327.2	4.33
1910.490	327.6	4.40

Retrograde motion with increasing distance.

9435 A. G. 232

R.A. $19^h\ 30^m\ 13^s$ Decl. $+35°\ 2'$

1911.467	278°.4	10″.76
11.473	278.4	10.54
11.498	278.1	10.67
1911.479	278.3	10.66

No change.

9438 Es 129. BD 52° (2459)

R.A. $19^h\ 30^m\ 23^s$ Decl. $+52°\ 33'$

1912.505	225°.8	3″.55
12.508	224.5	3.67
12.511	222.9	3.46
1912.508	224.4	3.56

Espin's original observation was:

1902	204°.2	2″.9	1n

β gives in *Carnegie Inst.* 168:

1908.32	224°.2	3″.36	3n

9441 H 5133

R.A. $19^h\ 30^m\ 35^s$ Decl. − 27° 14′

1911.728	9°.9	22″.44
12.437	9.5	22.05
12.628	10.4	22.33
1912.264	9.9	22.27

Some increase in distance.

9444 ♅V 104 (... 10.5)

R.A. $19^h\ 30^m\ 55^s$ Decl. + 15° 37′

1910.482	126°.4	39″.00
10.518	126.4	38.46
10.551	126.5	38.61
10.709	126.1	38.90(a)
1910.565	126.4	38.74

(a) B very faint.
Perhaps some change in angle.

9449 A. G. 234

R.A. $19^h\ 31^m\ 18^s$ Decl. + 36° 1′

1911.467	145°.7	2″.75
11.473	324.7	2.82
11.498	328.2	2.69
1911.479	326.2	2.75

Apparently fixed.

9450 Σ 2544

R.A. $19^h\ 31^m\ 19^s$ Decl. + 8° 3′

A and B

1910.709	200°.7	1″.02
11.459	202.8	1.09
11.467	199.8	1.14
1911.212	201.1	1.08

Retrograde motion with no change in distance.

A and C

1910.709	237°.5	15″.26
11.459	238.6	15.52
11.467	237.7	15.43
1911.212	237.9	15.40

No change in AC.

9452 A 106

R.A. $19^h\ 31^m\ 33^s$ Decl. − 5° 51′

A and B

1911.634	209°.1	1″.24
11.651	207.2	1.28
11.656	205.8	1.22
1911.647	207.4	1.25

As yet no change.

A and C (10.0)

1911.634	8°.9	57″.50
11.651	9.3	57.46
11.656	9.0	57.71
1911.647	9.1	57.56

No prior measures of C.

9454 Hu 342

R.A. $19^h\ 31^m\ 44^s$ Decl. + 17° 7′

1910.482	251°.5	4″.75
10.487	255.7	4.67
10.493	255.0	4.62
10.499	254.3	4.44
1910.490	254.1	4.62

Unchanged.

9456 Σ 2553

R.A. $19^h\ 31^m\ 49^s$ Decl. + 61° 47′

1911.517	100°.4	0″.92(a)
11.577	102.6	1.03
11.621	102.2	0.96
1911.572	101.7	0.97

(a) Poor seeing.
Slow direct motion with no change in distance.

9458 ♅VI 26. *ε Sagittae*

R.A. $19^h\ 31^m\ 51^s$ Decl. + 16° 12′

1910.487	81°.3	89″.59
10.493	81.5	89.57
10.499	81.5	89.78
1910.493	81.4	89.65

The distance is slowly decreasing.

9459 ΟΣ 377

R.A. 19h 31m 53s Decl. + 35° 23′

A and B

1911.577	36°.5	0″.91
11.626	34.8	0.91
11.629	212.7	0.97
1911.611	34.7	0.93

Slow retrograde motion with constant distance.

A and C

1911.626	153°.9	25″.44
11.629	153.8	.....
12.678	155.4	25.58
1911.978	154.4	25.51

Unaltered.

9466 β 249

R.A. 19h 32m 13s Decl. + 0° 4′

1910.777	138°.5	1″.02(a)
11.465	134.9	1.20
11.467	136.3	1.14
1911.236	136.6	1.12

(a) Very thick.

The measures are discordant. Change, if any, is small.

9472 A 598

R.A. 19h 32m 30s Decl. + 41° 8′

A and B

1912.516	201°.2	1″.22
12.691	199.2	1.23
12.697	200.0	1.17
1912.635	200.1	1.21

As yet no motion.

A and C

1912.516	95°.8	47″.78
12.691	95.9	47.67
12.697	95.7	47.86
1912.635	95.8	47.77

Not previously measured.

9479 H 2884

R.A. 19h 32m 47s Decl. − 18° 44′

1911.673	119°.1	18″.88
11.717	119.2	18.64
11.758	119.7	18.80
1911.716	119.3	18.77

Herschel's description is:

1830 +	118°.8	15″ ±

9500 Σ 2556

R.A. 19h 34m 17s Decl. + 21° 59′

1910.706	139°.3	0″.42
11.432	134.9	0.47
11.467	134.0	0.45
11.476	132.6	0.39
1911.270	135.2	0.43

Both angle and distance are decreasing. The quadrants are erroneously marked on the diagram in β G. C.

9511 A 272

R.A. 19h 35m 12s Decl. + 25° 55′

A and B

1911.656	194°.1	0″.94
15.593	195.2	0.91
1913.624	194.6	0.92

The change of angle suggested by Doolittle is not verified.

A and C

1911.656	307°.2	14″.50
15.593	307.8	14.66
1913.624	307.5	14.58

Fixed.

9516 Σ 2560 *rej.* *Vulpeculae* 40

R.A. 19h 35m 34s Decl. + 23° 26′

A and B

1910.551	293°.7	15″.34
10.562	293.0	15.37
10.709	294.1	15.36
1910.607	293.6	15.36

No measures prior to 1901.

A and C

1910.551	67°.2	118″.97
10.562	67.1	118.39
1910.556	67.1	118.68

Not previously measured.

9517 Es —

R.A. 19ʰ 35ᵐ 34ˢ Decl. + 64° 47′

1911.541	22°6	9″19
11.563	22.5	9.01
11.621	22.5	9.29
1911.575	22.5	9.16

Probably unchanged.

9521 Σ 2564

R.A. 19ʰ 35ᵐ 49ˢ Decl. + 63° 33′

1911.708	167°8	9″69
11.717	169.4	9.66
11.725	168.3	9.54
1911.717	168.5	9.63

Decrease in both angle and distance.

9526 H 1431

R.A. 19ʰ 36ᵐ 36ˢ Decl. + 41° 12′

See Fox 30 on page 226.

9535 OΣ 382

R.A. 19ʰ 37ᵐ 0ˢ Decl. + 27° 6′

1912.500	165°4	0″35
15.596	348.4	0.38
1914.048	346.9	0.37

Possibly some decrease in angle. A much greater change is necessary to make this certain.

9536 A 371

R.A. 19ʰ 37ᵐ 2ˢ Decl. + 30° 46′

1911.626	37°7	2″40
11.651	34.4	2.34
11.654	33.4	2.48
1911.644	35.2	2.41

1909.51	35°4	2″22	3n	Doo

[Doolittle (*Pub. Flower Obsy.* IV)]

No significant change.

9546 Es —

R.A. 19ʰ 37ᵐ 46ˢ Decl. + 64° 39′

1911.541	312°7	3″00
11.563	312.9	2.89
11.621	312.7	3.00
1911.575	312.8	2.96

Unaltered.

9550 A 273

R.A. 19ʰ 38ᵐ 0ˢ Decl. + 27° 46′

1911.626	155°0	1″88
11.654	150.3	1.81
11.670	152.1	1.71
1911.650	152.5	1.80

Probably unaltered.

9552 β 1132

R.A. 19ʰ 38ᵐ 11ˢ Decl. + 26° 39′

1912.730	216°9	0″48
15.602	218.7	0.53(a)
15.602	216.5	0.46(b)
1914.645	217.4	0.49

(a) Beautiful seeing. (b) Inadvertently measured a second time on the same night.

Possibly slow retrograde motion.

9561 H 5144

R.A. 19ʰ 38ᵐ 39ˢ Decl. − 25° 49′

1912.437	10°3	9″87
12.587	9.8	10.17
12.628	11.5	10.11
1912.551	10.5	10.05

Without change.

9565 OΣ 383

R.A. 19ʰ 38ᵐ 52ˢ Decl. + 40° 26′

1912.500	22°6	0″90
12.516	23.1	0.96
12.579	19.9	1.02
1912.532	21.9	0.96

Change is still uncertain.

9570 Σ 2574

R.A. 19ʰ 39ᵐ 5ˢ Decl. + 62° 23′

1912.478	157°1	0″34
12.480	156.1	0.38
12.730	158.5	0.38
1912.563	157.2	0.37

The measures of the next few years will be of great interest. Van Biesbroeck gives a good series of observations of this pair. (*Ann. Observ. Belgique*, N. S. XIII.)

9595 A. G. 237

R.A. $19^h\ 40^m\ 37^s$ Decl. $+30°\ 31'$

1911.728	146°.2	2″.34
11.823	146.9	2.42
12.319	141.5	2.60
12.352	141.4	2.40(a)
1912.056	144.0	2.44

(a) Twilight. Measured with dark wires. Seeing very good.

Apparently unchanged.

9602 Σ 2576

R.A. $19^h\ 41^m\ 0^s$ Decl. $+33°\ 20'$

1911.626	285°.7	2″.29
11.651	105.6	2.20
11.654	285.6	2.21
1911.644	285.6	2.23

Star (12.5) in 240° : 15″.

Retrograde motion with decreasing distance.

9604 β 828 (8.0 ... 10.5)

R.A. $19^h\ 41^m\ 3^s$ Decl. $+5°\ 52'$

1911.626	8°.4	3″.04
11.629	7.5	3.03
11.632	7.4	2.97
12.708	5.2	2.91
1911.899	7.1	2.98

Immobile.

9605 Σ 2579. *δ Cygni*

R.A. $19^h\ 41^m\ 13^s$ Decl. $+44°\ 50'$

1912.516	283°.6	1″.97
12.579	279.1	2.15
12.593	282.1	2.14
12.612	283.1	1.85
12.615	279.2	2.11
1912.583	281.4	2.04

There are many recent observations of this well-known binary.

9625 Es 83

R.A. $19^h\ 42^m\ 21^s$ Decl. $+44°\ 40'$

1911.717	211°.5	7″.23
11.777	209.6	7.15
11.812	212.3	7.49
1911.769	211.1	7.29

Faint star in position 193° : 15″ from B.

1912.50	210°.3	7″.26	3n

[Woods (*A. J.* 644)]

9632 Doo 11

R.A. $19^h\ 43^m\ 0^s$ Decl. $+24°\ 29'$

1912.467	282°.1	2″.80
12.491	281.3	2.75
12.500	281.4	2.83
1912.486	281.6	2.79

Unaltered.

9633 β 829

R.A. $19^h\ 43^m\ 2^s$ Decl. $+5°\ 27'$

1912.686	313°.4	0″.80
15.656	311.4	0.80
1914.171	312.4	0.80

Fixed.

9634 Σ 2583. *π Aquilae*

R.A. $19^h\ 43^m\ 3^s$ Decl. $+11°\ 31'$

A and B

1911.626	117°.6	1″.77
11.629	116.1	1.68
11.632	115.3	1.60
1911.629	116.3	1.68

There are several recent measures of this pair. No relative motion.

A and C

1911.626	304°.0	33″.72
11.629	303.9	33.57
11.632	303.6	33.64
1911.629	303.8	33.64

No certain change.

9641 Σ 2586

R.A. $19^h\ 43^m\ 32^s$ Decl. $+24°\ 40'$

A and B

1912.467	226°.1	3″.81
12.491	225.7	3.72
12.500	226.1	3.83
1912.486	226.0	3.79

Immobile.

A and C

1912.467	268°.7	63″.60
12.491	268.8	63.46
12.500	268.6	63.43
1912.486	268.7	63.50

No previous measures.

9650 OΣ 387

R.A. $19^h\ 44^m\ 15^s$ Decl. + 35° 0′

1912.579	320°.1	0″.70
12.727	321.1	0.67
12.730	320.0	0.62
1912.679	320.4	0.66

A very interesting binary.

9652 A. G. 238

R.A. $19^h\ 44^m\ 25^s$ Decl. + 6° 55′

1912.686	273°.4	5″.68
12.708	272.5	5.80
12.727	272.3	5.70
1912.707	272.7	5.73

1907.48	273°.8	5″.73	3n	β
1910.44	272.2	6.05	3n	Doo

[β (*Carnegie Inst.* 168) . . . Doolittle (*Pub. Flower Obsy.* IV)]

Change is doubtful.

9653 A 375. BD 31° (3790)

R.A. $19^h\ 44^m\ 26^s$ Decl. + 31° 53′

1910.416	342°.5	0″.89
10.433	343.8	1.08
10.444	163.6	1.04
10.449	165.8	0.88
11.577	344.8	1.19
1910.664	344.1	1.02

I examined BD 31° (3790) to test for duplicity at Espin's request. It is A 375. Aitken misidentified the star.

9668 Es 130

R.A. $19^h\ 45^m\ 48^s$ Decl. + 60° 51′

1912.593	60°.0	2″.89
12.615	242.0	2.86
12.628	58.4	2.79
1912.612	60.1	2.85

Without change.

9669 A 376

R.A. $19^h\ 45^m\ 52^s$ Decl. + 7° 20′

1912.686	128°.4	2″.27
12.727	129.1	2.14
12.762	128.2	2.15
1912.725	128.6	2.19

Without change.

9672 H 2905

R.A. $19^h\ 46^m\ 6^s$ Decl. + 60° 55′

1912.615	195°.5	9″.29
12.628	194.4	9.23
12.669	193.0	9.32
1912.637	194.3	9.28

Immediately following **9668**. The earliest measure for comparison is:

1902.69	196°.9	8″.61	2n	Es

9676 Hu 350

R.A. $19^h\ 46^m\ 18^s$ Decl. + 19° 50′

1912.593	43°.0	3″.49
12.615	43.5	3.37
12.678	42.9	3.43
1912.629	43.1	3.43

No motion as yet.

9683 A. G. 240

R.A. $19^h\ 46^m\ 35^s$ Decl. + 47° 30′

1912.754	254°.8	14″.74
12.760	74.8	14.74
12.762	254.7	14.72
1912.759	254.8	14.73

Apparently no motion.

9696 A. G. 241

R.A. $19^h\ 47^m\ 31^s$ Decl. + 8° 2′

1912.686	195°.8	10″.73
12.762	195.4	10.79
12.820	196.1	10.80
1912.756	195.8	10.77

Probably unaltered.

9818 Σ 2613. *Aquilae* 210

R.A. $19^h\ 55^m\ 43^s$ Decl. + 10° 25′

1907.638	347°.8	4″.41	12
07.663	347.8	4.79	12
07.695	349.4	4.33	12
1907.665	348.3	4.51	

Fixed.

9899 H 902

R.A. $20^h\ 0^m\ 31^s$ Decl. + 1° 47′

1910.529	15°4	7″11
10.722	16.3	6.97
10.733	15.7	7.03
1910.661	15.8	7.04

1908.59	18°0	7″09	2n	Lau
1910.61	16.0	7.08	4n	Woods

Lau (*A. N.* 4279) . . . Woods (*A. J.* 644)]

No early measures for comparison.

9908 β 428

R.A. $20^h\ 1^m\ 5^s$ Decl. + 12° 36′

1910.383	352°6	....(a)
10.496	353.8	0″59
10.499	349.5	0.56
10.509	353.2	0.68
1910.472	352.3	0.61

(a) Dense fog.
No evidence of motion.

9911 H 904 (8.3 ... 10.0)

R.A. $20^h\ 1^m\ 14^s$ Decl. + 10° 14′

1910.430	317°1	27″97
10.458	317.1	27.08
10.460	317.2	27.59
10.465	316.9	27.57
1910.453	317.1	27.55

No early measures for comparison.

9917 H 905 (8.7 ... 10.5)

R.A. $20^h\ 1^m\ 29^s$ Decl. + 10° 14′

1910.430	169°6	11″66
10.458	170.4	11.71
10.460	169.7	12.09
10.465	169.0	11.68
1910.453	169.7	11.79

1911.55	170°7	11″17	4n	Woods

[Woods (*A. J.* 644)]

No early measures.

9921 Σ 2627. BD 4° (4350)

R.A. $20^h\ 1^m\ 44^s$ Decl. + 4° 26′

A and B

1912.568	29°7	2″05
12.579	28.6	1.96
12.582	28.2	1.90
1912.576	28.8	1.97

No change.

A and C (7.9). BD 4° (4349)

1912.579	261°7	80″39
12.582	261.6	80.31
1912.580	261.7	80.35

No prior measures.

13505 A 865

R.A. $20^h\ 1^m\ 52^s$ Decl. + 70° 6′

1912.754	88°1	2″60
12.760	86.4	2.54
12.820	83.5	2.69
1912.778	86.0	2.61

As yet no change.

9930 Hu 80

R.A. $20^h\ 2^m\ 20^s$ Decl. − 19° 46′

1911.503	359°3	2″63(a)
11.514	1.8	2.60
11.602	1.4	2.55
1911.540	360.8	2.59

(a) Seeing poor. B very faint.
Probably unchanged.

9935 Σ 2640

R.A. $20^h\ 3^m\ 14^s$ Decl. + 63° 33′

1910.367	17°5	5″46
10.397	17.7	5.46
10.400	16.6	5.55
1910.388	17.3	5.49

Slow retrograde motion with increase in distance.

9939 β 470

R.A. $20^h\,3^m\,41^s$ Decl. + 63° 25′

1910.397	212°.4	2″.67
10.400	211.0	2.75
11.577	210.9	2.57
1910.791	211.4	2.66

Apparently no change.

9944 Σ 2642

R.A. $20^h\,3^m\,57^s$ Decl. + 63° 21′

1910.367	172°.4	2″.26
10.397	171.5	2.26
10.400	170.9	2.33
1910.388	171.6	2.28

Little if any relative motion.

9948 H 2933

R.A. $20^h\,4^m\,6^s$ Decl. + 1° 42′

1910.430	26°.1	21″.83
10.458	27.0	21.65
10.465	26.6	21.49
1910.451	26.6	21.66

1908.60	27°.4	21″.91	2n	Lau

[Lau (*A. N.* 4279)]

There are no early measures.

9949 Σ 2634

R.A. $20^h\,4^m\,6^s$ Decl. + 16° 27′

1910.460	10°.8	5″.88
10.465	10.1	5.74
10.468	12.0	6.26(a)
10.473	11.5	5.67
1910.467	11.1	5.89

(a) Seeing very bad.

Slow decrease in distance.

9965 H 2936

R.A. $20^h\,5^m\,19^s$ Decl. + 58° 47′

1911.708	252°.7	12″.75
11.717	251.1	12.75
11.777	251.1	12.72
1911.734	251.6	12.74

1907.80	251°.9	12″.44	3n	Bies
1908.61	252.0	12.62	3n	β

[Van Biesbroeck (*Ann. Observ. Belgique,* N. S. XIII) . . . β (*Carnegie Inst.* 168)]

No earlier observations.

.... BD 25° (4130) (9.4 ... 10.3)

R.A. $20^h\,5^m\,23^s$ Decl. + 25° 10′

1912.579	8°.5	5″.67
12.587	9.6	5.71
12.593	10.2	5.68
1912.586	9.5	5.69

This pair is *sp* 9990 = Doo 14.

1903.930	191°.1	5″.13	3n	Howard

[Howard (*A. J.* 591)]

9970 Es 87

R.A. $20^h\,5^m\,44^s$ Decl. + 36° 23′

1910.476	296°.6	9″.29
10.559	296.3	9.29
10.562	296.3	9.56
1910.532	296.4	9.38

Fixed.

9977 A 281

R.A. $20^h\,6^m\,2^s$ Decl. + 34° 31′

1910.476	172°.1	4″.10
10.559	170.5	4.01
10.562	169.5	4.17
1910.532	170.7	4.09

As yet no change.

9980 OΣ 399

R.A. $20^h\,6^m\,17^s$ Decl. + 36° 41′

1911.470	276°.8	4″.59
11.489	277.4	4.51
11.495	277.5	4.62
1911.485	277.2	4.57

Fixed.

9981 Doo 13

R.A. $20^h\,6^m\,24^s$ Decl. + 40° 51′

1911.506	257°.6	2″.98
11.517	257.4	3.03
11.541	259.4	2.89
1911.521	258.1	2.97

No change since discovery in 1900.

9982 Σ 2644

R.A. $20^h\,6^m\,28^s$ Decl. + 0° 31′

1907.638	207°.4	3″.25	12
07.663	204.8	3.17	12
07.695	207.6	3.19	12
1907.665	206.6	3.20	

Fixed.

9987 β 430

R.A. $20^h\ 6^m\ 48^s$ Decl. + 35° 28′

A and B

1911.634	19°.3	1″.10
11.656	19.7	1.13
12.579	17.5	1.08
1911.956	18.8	1.10

A and C

1911.634	51°.2	17″.39
11.656	50.7	17.44
12.579	50.4	17.60
1911.956	50.8	17.48

No significant change in any component.

9990 Doo 14

R.A. $20^h\ 6^m\ 53^s$ Decl. + 25° 32′

1912.579	259°.9	2″.02
12.587	259.9	2.09
12.593	258.7	2.06
1912.586	259.5	2.06

As yet no change.

9991 Σ 2648

R.A. $20^h\ 6^m\ 54^s$ Decl. + 49° 28′

1911.506	116°.7	6″.65
11.517	116.6	6.59
11.541	116.9	6.66
1911.521	116.7	6.63

The distance may be increasing slowly.

9995 H 2938

R.A. $20^h\ 7^m\ 5^s$ Decl. + 7° 0′

1910.529	149°.6	18″.64
10.733	150.0	18.54
10.753	149.9	18.52
1910.672	149.8	18.57

There are no early observations.

9997 Es 132

R.A. $20^h\ 7^m\ 12^s$ Decl. + 56° 36′

A and B

1911.517	81°.6	5″.67
11.563	81.8	5.55
11.574	82.3	5.52
1911.551	81.9	5.58

1908.09	82°.4	5″.58	3n

A and C

1911.517	61°.0	37″.72
11.563	60.6	37.52
11.574	60.7	37.49
1911.551	60.8	37.58

1908.09	60°.3	37″.67	3n	β

[β (*Carnegie Inst.* 168)]

9999 A. G. 248

R.A. $20^h\ 7^m\ 18^s$ Decl. + 1° 7′

1910.465	355°.8	3″.93
10.479	357.0	3.95
10.482	355.9	3.86
1910.475	356.2	3.91

Possibly some increase in distance.

.... BD 58° (2062) (10.0 ... 11.7)

R.A. $20^h\ 7^m\ 30^s$ Decl. + 58° 35′

A and B

1911.708	175°.7	5″.51
11.717	179.4	5.27
11.777	179.8	5.48
1911.734	179.6	5.42

sf **9965** = H 2936.

A and C (10.5)

1911.717	347°.4	29″.00
11.777	347.6	29.06
1911.747	347.5	29.03

.... BD 58° (2065) (9.7 .... 10.1)

R.A. $20^h\ 7^m\ 53^s$ Decl. + 58° 17′

1911.708	107°.9	6″.59
11.717	106.3	6.50
11.777	107.1	6.47
1911.734	107.1	6.52

sf **9965** = H 2936.

10009 Σ 2646. *Aquilae* 241

R.A. 20h 8m 1s Decl. − 6° 25′

1911.528	46°.1	21″.89
11.539	45.6	21.81
11.563	46.7	22.02
1911.543	46.1	21.91

β deduces from the micrometric observations a proper motion of 0″.044 in 81°.5. He also adds a third star. (*Carnegie Inst.* 168).

10013 A. G. 250

R.A. 20h 8m 19s Decl. + 34° 7′

1912.500	55°.3	8″.77
12.568	52.5	8.73
12.582	52.2	8.87
1912.550	53.3	8.79

No change.

10017 Σ 2653

R.A. 20h 8m 31s Decl. + 23° 52′

1911.525	264°.0	2″.63
11.539	264.2	2.57
11.563	263.8	2.58
1911.542	264.0	2.59

Angle probably increasing.

10027 β 762

R.A. 20h 9m 19s Decl. − 32° 59′

1911.634	301°.8	2″.54
12.683	304.1	2.40
12.762	304.4	2.46
1912.360	303.4	2.47

Entirely fixed.

10030 A 385

R.A. 20h 9m 32s Decl. + 40° 29′

1912.467	259°.8	2″.88
12.500	258.5	2.89
12.582	257.7	2.95
12.587	258.6	2.89
1912.534	258.6	2.90

No evidence of change.

10032 Ho 589

R.A. 20h 9m 42s Decl. − 8° 6′

A and B

1911.626	319°.5	16″.12
11.629	320.8	15.92
11.632	321.1	15.61
1911.629	320.5	15.88

Probably unchanged.

A and C (10.5)

1911.629	200°.8	56″.11
11.632	200.6	56.27
1911.630	200.7	56.19

First measured by Doolittle in 1906. No change.

10035 Σ 2656. *Aquilae* 250

R.A. 20h 9m 46s Decl. + 7° 26′

1910.529	233°.9	9″.59
10.733	234.6	9.75
10.753	233.8	9.71
1910.672	234.1	9.68

Unaltered.

10044 Σ 2658

R.A. 20h 10m 29s Decl. + 52° 45′

A and B

1912.467	117°.1	5″.28
12.505	116.0	5.45
12.593	115.5	5.37
1912.522	116.2	5.37

A and C

1912.467	209°.2	46″.54
12.505	210.0	46.40
12.593	210.0	46.30
1912.522	209.7	46.41

β deduces proper motions of both A and B.

10045 Es 27

R.A. 20h 10m 32s Decl. + 46° 30′

1912.467	336°.9	4″.18		
12.505	338.6	4.18		
12.593	338.7	4.17		
1912.522	338.1	4.18		
1911.31	159°.2	4″.25	4n	Woods

[Woods (*A. J.* 644)]

Probably unchanged.

10046 Hu 268

R.A. $20^h\ 10^m\ 34^s$ Decl. − 15° 32′

1911.528	206°7	3″19
11.563	206.6	3.19
11.566	207.3	2.98
1911.552	206.9	3.12

Apparently fixed.

10050 Ho 123

R.A. $20^h\ 10^m\ 55^s$ Decl. − 16° 12′

1911.525	222°3	3″35
11.528	42.1	3.16
11.563	222.7	3.26
1911.539	222.4	3.26

The distance is possibly increasing slowly.

10053 A 389. BD 26° (3846)

R.A. $20^h\ 11^m\ 0^s$ Decl. + 26° 41′

1912.568	209°2	1″78
12.678	207.1	1.87
12.686	209.1	1.80
1912.644	208.5	1.82

No change.

.... A 2279. BD 1° (4248) (8.9 ... 11.3)

R.A. $20^h\ 11^m\ 18^s$ Decl. + 1° 6′

1910.479	301°9	4″54
10.482	301.2	4.48
10.529	299.1	4.62
1910.497	300.7	4.55

These measures are prior to Aitken's discovery (*Bull. L. O.* 188).

1910.65 300°3 4″15 2n A

10059 Σ 2659

R.A. $20^h\ 11^m\ 38^s$ Decl. + 43° 17′

See Fox 39, page 227.

10061 A. G. 251

R.A. $20^h\ 11^m\ 51^s$ Decl. + 5° 49′

1911.634	182°8	7″45
11.637	182.8	7.49
11.654	182.9	7.51
1911.642	182.8	7.48

The distance of 1894 is probably too great.

A and C

1911.634	222°9	87″50
11.637	223.0	87.50
11.654	223.2	87.66
1911.642	223.0	87.55

There are no prior measures of C.

10065 H 911

R.A. $20^h\ 12^m\ 8^s$ Decl. − 3° 7′

1911.634	123°9	19″90
11.637	124.3	19.96
11.654	123.6	19.95
1911.642	123.9	19.94

1912.53 123°2 19″58 3n Woods

[Woods (*A. J.* 644)]

There are no early measures.

10073 Ho 591 (9.8 ... 11.2)

R.A. $20^h\ 12^m\ 33^s$ Decl. + 27° 31′

1912.500	297°3	2″78
12.568	292.7	2.75
12.669	290.1	2.64
12.727	296.1	....
1912.616	294.0	2.72

Not in BD. Follows BD 27° (3666 ... 3668). The distance is increasing.

10075 Hu 585

R.A. $20^h\ 12^m\ 34^s$ Decl. + 50° 46′

1911.717	47°1	4″70
11.777	47.9	4.76
11.788	47.1	4.69
1911.761	47.4	4.72

Apparently unchanged.

.... Anon. (10.1 ... 11.1)

R.A. $20^h\ 12^m\ 40^s$ Decl. + 43° 12′

1915.629	278°0	5″45
15.640	278.6	5.59
15.648	278.3	5.76
1915.639	278.3	5.60

10^s *f* and 106″9 *s* of BD 43° (3549).

.... BD 43° (3553) (8.0 ... 8.6)

R.A. $20^h\ 12^m\ 55^s$ Decl. + 43° 14′

1913.715	245°.6	18″.80
14.460	245.7	18.83
1914.088	245.7	18.82

nf **10031** = *β* 660.

10089 See 414

R.A. $20^h\ 13^m\ 9^s$ Decl. − 27° 33′

1911.632	....	2″.24
11.634	49°.3	2.30
15.602	49.7	2.26
1912.956	49.5	2.27

Unchanged.

10094 A. G. 252

R.A. $20^h\ 13^m\ 31^s$ Decl. + 39° 33′

1912.593	125°.3	10″.85
12.628	124.9	11.04
12.669	123.5	11.00
1912.630	124.6	10.96

Star (12.5) in 60° : 22″. Several faint stars near. Unchanged.

10103 OΣ 405

R.A. $20^h\ 14^m\ 0^s$ Decl. + 32° 53′

1912.480	148°.7	0″.80
12.727	151.2	0.77
12.730	148.7	0.79
1912.646	149.5	0.79

Without appreciable motion.

10113 Schj. 25

R.A. $20^h\ 14^m\ 20^s$ Decl. − 8° 7′

1911.626	216°.7	3″.00
11.629	216.5	2.79
11.632	216.6	2.92
1911.629	216.6	2.90

Fixed.

10115 *β* 1206

R.A. $20^h\ 14^m\ 36^s$ Decl. + 36° 23′

1912.568	0°.3	2″.02
12.593	359.2	2.08
12.669	359.4	2.39
1912.610	359.6	2.16

No evidence of motion.

10120 A. G. 253

R.A. $20^h\ 14^m\ 46^s$ Decl. + 36° 13′

1912.568	118°.6	9″.60
12.593	118.3	9.53
12.669	117.0	9.54
1912.610	118.0	9.56

Fixed.

10147 Σ 2672

R.A. $20^h\ 16^m\ 25^s$ Decl. + 23° 23′

1912.480	301°.6	0″.85
12.686	301.9	0.86
12.727	301.9	0.85
1912.631	301.8	0.85

Slow direct motion.

.... BD 42° (3722) (9.8 ... 10.1)

R.A. $20^h\ 18^m\ 49^s$ Decl. + 42° 48′

1915.599	174°.6	4″.53
15.618	171.6	4.50
15.637	171.2	4.45
15.640	172.9	4.53
1915.624	172.6	4.50

This is possibly **10183** = Lewis 34. See *β* (*A. N.* 4302).

10192 Ho 457

R.A. $20^h\ 19^m\ 25^s$ Decl. + 29° 0′

1912.686	58°.4	2″.14
12.708	57.9	2.15
12.749	61.4	2.12
12.760	57.8	2.15
12.762	58.8	2.18
1912.733	58.9	2.15

No appreciable change.

10198 A. G. 254

R.A. $20^h\ 19^m\ 46^s$ Decl. + 31° 49′

1912.568	343°.0	5″.45
12.593	343.9	5.55
12.628	342.6	5.49
12.678	345.0	5.54
1912.617	343.6	5.51

Star (12.0) in 305° : 25″ ±. No evidence of motion.

10203 β 432

R.A. $20^h\ 20^m\ 12^s$ Decl. $+35°\ 23'$

1912.593	196°.7	1″.47
12.686	196.7	1.41
12.689	192.2	1.40
1912.656	195.2	1.43

Change is doubtful.

10211 A 47

R.A. $20^h\ 20^m\ 53^s$ Decl. $+35°\ 30'$

1912.593	178°.0	1″.57
12.686	178.1	1.53
12.689	173.1	1.51
1912.656	176.4	1.54

No change since 1899.

10220 Ho 130

R.A. $20^h\ 21^m\ 42^s$ Decl. $+36°\ 48'$

1908.799	283°.7	2″.09	40
09.973	281.6	2.06	
09.975	283.3	2.06	
1909.582	282.9	2.07	

Unchanged.

10222 A. G. 255

R.A. $20^h\ 21^m\ 45^s$ Decl. $+37°\ 4'$

1911.717	284°.6	5″.13
11.777	286.1	5.15
11.788	285.1	5.05
1911.761	285.3	5.11

Fixed.

13530 A 729

R.A. $20^h\ 21^m\ 23^s$ Decl. $+57°\ 42'$

A and B

1912.768	250°.2	3″.04
12.820	254.2	2.91
12.845	248.7	2.95(a)
1912.811	251.0	2.97

Unchanged.

A and C

1912.768	69°.4	36″.34
12.820	70.0	36.40
12.845	70.2	36.56(a)
1912.811	69.9	36.43

(a) Seeing very bad.
No prior measures of C.

10231 A. G. 256

R.A. $20^h\ 22^m\ 9^s$ Decl. $+9°\ 34'$

A and B

1912.500	349°.6	5″.18
12.584	350.0	5.21
12.683	349.3	5.18
1912.589	349.6	5.19

The measures are erratic. No change. In the Appendix to Vol. II β G. C. measures of this star are credited to **10232**.

A and C (10.5)

1912.584	225°.7	97″.94
12.683	225.6	97.91
1912.633	225.6	97.92

Several faint stars nearer. No prior measures.

10235 H 1516

R.A. $20^h\ 22^m\ 26^s$ Decl. $+54°\ 17'$

A and B

1912.754	147°.5	47″.13		
12.760	147.4	47.15		
12.768	147.7	47.21		
1912.761	147.5	47.16		
1907.38	148°.0	47″.09	3n	β

[β (*Carnegie Inst.* 168)]

No earlier measures.

A and C (12.0)

1912.754	203°.7	49″.60
12.760	203.0	49.52
12.768	204.3	49.24
1912.761	203.7	49.45

The three stars form a nearly equilateral triangle. β and Van Biesbroeck mention this star but there are no measures of it.

10295 Ho 133 = Hn 160

R.A. $20^h\ 26^m\ 10^s$ Decl. $-13°\ 57'$

See page 38.

13536 A 739

R.A. $20^h\ 30^m\ 4^s$ Decl. $+56°\ 47'$

1912.768	197°.8	4″.59
12.820	197.2	4.69
12.877	197.7	4.81
1912.822	197.6	4.70

The angle may have increased.

13540 A 745

R.A. 20ʰ 35ᵐ 5ˢ Decl. + 56° 12′

1912.768	314°4	2″24
12.820	311.3	2.30
12.877	315.6	2.12
1912.822	313.8	2.22

Aitken's original measures give:

1904.50	319°0	2″14	3n

10447 Σ 2718

R.A. 20ʰ 36ᵐ 52ˢ Decl. + 12° 18′

1907.638	86°9	8″69	12
07.695	86.2	8.95	12
07.701	84.3	9.19	12
07.720	87.6	8.73	12
1907.688	86.2	8.89	

The measures of distance are discordant. Change is uncertain.

10676 Σ 2742. 2λ *Equulei*

R.A. 20ʰ 56ᵐ 17ˢ Decl. + 6° 43′

1907.638	220°0	2″93	12
07.695	220.8	2.79	12
07.720	221.5	2.90	12
1907.684	220.8	2.87	

No significant change.

10726 A 178

R.A. 21ʰ 0ᵐ 30ˢ Decl. + 20° 49′

1910.433	73°1	0″80
10.496	72.4	0.86
10.509	72.7	0.95
1910.479	72.7	0.87

Apparently fixed.

10727 Σ 2752. *Aquarii* 43

R.A. 21ʰ 0ᵐ 31ˢ Decl. − 14° 24′

A and B

1910.518	152°7	5″91
10.523	152.3	5.71
10.775	152.4	5.76
1910.605	152.5	5.79

Little if any relative motion.

A and C

1910.518	66°5	9″50(a)
10.523	66.9	9.85(a)
10.775	67.0	9.56
1910.605	66.8	9.64

(a) C faint.

From measures of C, β finds the proper motion to be 0″364 in 94°3. (*Carnegie Inst.* 168).

10732 Σ 2758. 61 *Cygni*

R.A. 21ʰ 1ᵐ 14ˢ Decl. + 38° 8′

1910.400	128°2	23″42
10.403	127.7	23.21
10.416	127.9	23.08
10.427	127.5	23.19
1910.412	127.8	23.22

There are many recent measures of this noteworthy pair.

10736 β 473

R.A. 21ʰ 1ᵐ 24ˢ Decl. − 10° 41′

1910.433	116°8	1″90		
10.479	117.9	2.11		
10.482	119.0	2.06		
1910.465	117.9	2.02		
1906.21	116°5	2″16	4n	Ol

[Olivier (*A. N.* 4166)]

No appreciable motion.

10737 Σ 2755

R.A. 21ʰ 1ᵐ 24ˢ Decl. − 0° 39′

1910.460	81°8	24″69
10.465	81.6	24.53
10.479	82.3	24.44
1910.468	81.9	24.55

No certain change.

.... SD − 15° (5897) (8.2 ... 11.5)

R.A. 21ʰ 1ᵐ 47ˢ Decl. − 15° 23′

1908.633	295°6	10″41	12
08.644	300.2	10.31	40
08.660	300.6	10.53	40
08.698	299.5	10.42	40
08.717	300.4	10.37	40
1908.670	299.3	10.41	

10746 Σ 2760 = S 774

R.A. $21^{h}\ 1^{m}\ 52^{s}$ Decl. + 33° 39′

1910.397	227°.3	5″.37
10.400	227.0	5.34
10.403	227.5	5.31
1910.400	227.3	5.34

Change due to proper motion.

10749 OΣ 527

R.A. $21^{h}\ 2^{m}\ 1^{s}$ Decl. + 4° 40′

1910.706	261°.7	0″.34
10.717	265.7	0.36
11.467	272.7	0.38
11.514	270.6	0.38
1911.101	267.7	0.36

1908.73 269°.8 0″.45 4n OWN

[Olivier, Wilson, Neff (*A. N.* 4360)]

Retrograde motion.

10751 H 1612

R.A. $21^{h}\ 2^{m}\ 56^{s}$ Decl. − 16° 56′

1911.492	136°.9	7″.60
11.591	136.2	7.72
11.599	136.1	7.75
1911.561	136.4	7.69

There are no early measures for comparison. This star is not in BD, but is 47^{s} *f* and 245″ *s* of SD − 16° (5803).

10762 Hu 765

R.A. $21^{h}\ 2^{m}\ 52^{s}$ Decl. + 61° 41′

B and C

1911.777	46°.4	0″.43(a)
11.821	48.8	0.40
12.730	46.4	0.50
1912.109	47.2	0.44

(a) Clean resolution.

Hussey's original observations give:

1904.49 43°.6 0″.46 2n

A and C = Σ 2764

1911.574	300°.6	7″.03
11.577	300.6	7.12
11.604	301.1	7.11
1911.585	300.8	7.09

Fixed.

10774 Σ 2771

R.A. $21^{h}\ 3^{m}\ 33^{s}$ Decl. + 70° 17′

1910.400	209°.9	2″.86
10.403	30.9	2.79
10.416	30.9	2.85
1910.406	30.6	2.83

The magnitudes are equal and the quadrant uncertain.

10777 Σ 2766

R.A. $21^{h}\ 3^{m}\ 54^{s}$ Decl. + 58° 31′

1910.758	249°.5	5″.08
10.895	248.7	4.87
11.495	247.3	5.19
1911.049	248.5	5.05

Fixed.

.... SD − 15° (5904) (9.8 ... 11.3)

R.A. $21^{h}\ 4^{m}\ 11^{s}$ Decl. − 14° 58′

1908.644	5°.5	13″.93	40
08.660	5.3	.....	40
08.698	6.1	14.18	40
08.717	7.2	13.85	40
1908.680	6.0	13.99	

Companion noted with the 12-inch.

.... Anon. (11.7 ... 12.8)

R.A. $21^{h}\ 4^{m}\ 15^{s}$ Decl. − 14° 58′

1908.644	38°.9	9″.95	40
08.660	37.2	....	40
08.717	35.7	9.54	40
1908.674	37.3	9.74	

4^{s} *f* and 52″.7 *s* of SD − 15° (5904).

10783 H 5251

R.A. $21^{h}\ 4^{m}\ 39^{s}$ Decl. − 23° 36′

1910.551	302°.7	8″.98
10.709	304.0	8.90
10.733	303.8	8.64
1910.664	303.5	8.84

The measures of distance are erratic. No motion.

10789 Hu 766

R.A. 21ʰ 4ᵐ 55ˢ Decl. + 61° 44′

1911.574	117°.2	0″.90
11.777	118.3	0.61(a)
11.821	115.8	0.65
12.801	115.8	0.74
1911.993	116.8	0.72

(a) Difficult. Fog and Moon.
Hussey's first observations yield:

1904.51	113°.5	0″.88	3n

10793 A 760

R.A. 21ʰ 5ᵐ 2ˢ Decl. + 58° 38′

1910.758	330°.6	3″.71
10.895	328.4	3.49
11.495	330.8	3.67
1911.049	329.9	3.62

No appreciable change.

10796 Σ 2770

R.A. 21ʰ 5ᵐ 21ˢ Decl. − 3° 37′

1910.397	244°.7	7″.69
10.403	244.4	7.82
10.444	245.2	7.84
1910.415	244.8	7.78

Fixed.

10798 H. C. Wilson 22

R.A. 21ʰ 5ᵐ 35ˢ Decl. − 23° 11′

1910.709	36°.7	9″.53
10.733	36.9	10.05(a)
10.769	38.0	9.76
10.777	36.5	9.82
1910.747	37.0	9.79

(a) Very faint. Clouds.
Fixed.

10801 ℌI 49

R.A. 21ʰ 5ᵐ 42ˢ Decl. − 15° 29′

1908.698	316°.5	3″.28	40
08.717	315.9	3.40	40
1908.707	316.2	3.34	

1908.82	316°.1	3″.41	3n	Ol, N

[Olivier, Neff (*A. N.* 4360)]
Slow retrograde motion.

10808 β 159

R.A. 21ʰ 6ᵐ 21ˢ Decl. + 47° 12′

1911.574	316°.0	1″.20
11.577	315.0	1.23
11.604	314.2	1.43
1911.585	315.1	1.29

No change. β (*Carnegie Inst.* 168) adds two distant stars.

10809 OΣ 430

R.A. 21ʰ 6ᵐ 35ˢ Decl. + 23° 40′

1910.479	204°.0	1″.44
10.496	204.4	1.47
10.722	204.7	1.35
1910.566	204.4	1.42

Retrograde motion.

10815 OΣ 431

R.A. 21ʰ 6ᵐ 57ˢ Decl. + 40° 45′

1910.452	117°.1	3″.15
10.458	116.9	3.06
10.553	117.9	3.25
1910.488	117.3	3.15

Fixed.

10820 H 1623

R.A. 21ʰ 7ᵐ 42ˢ Decl. + 36° 50′

For measures of this star see Fox 41 on p. 227.

10822 Doo 16

R.A. 21ʰ 7ᵐ 44ˢ Decl. + 55° 51′

1911.476	28°.3	1″.16
11.517	28.9	0.93
11.541	27.8	1.01
1911.511	28.3	1.03

Doolittle's original observation:

1900.65	30°.6	1″.02	3n

.... Es 208. BD 36° (4469) (9.2 ... 10.9)

R.A. 21ʰ 8ᵐ 33ˢ Decl. + 37° 4′

1911.777	146°.7	3″.84
11.788	145.6	3.87
12.434	141.7	3.83
1912.000	144.7	3.85

1904.82	143°.0	3″.7	2n	Es

[Espin (*M. N.* LXV, 712)]
nf 10820 = H 1623.

10832 Σ 2780

R.A. $21^h\ 8^m\ 45^s$ Decl. + 59° 30′

1910.796	219°.3	1″.11
11.462	222.9	1.22
11.470	218.6	1.06
1911.243	220.3	1.13

Probably unchanged.

10835 Σ 2779

R.A. $21^h\ 9^m\ 16^s$ Decl. + 28° 35′

1910.720	179°.7	17″.11
10.769	178.7	17.17
10.788	178.5	17.14
1910.759	179.0	17.14

β adds a third star to determine which star has the proper motion.

10838 Σ 2778

R.A. $21^h\ 9^m\ 28^s$ Decl. − 1° 44′

1910.769	273°.1	19″.69
10.775	273.4	19.59
10.777	272.9	19.51
1910.774	273.1	19.60

Change due to proper motion.

10841 OΣ 432

R.A. $21^h\ 9^m\ 43^s$ Decl. + 40° 39′

1910.452	120°.6	1″.29
10.553	120.5	1.44
11.470	118.9	1.30
1910.825	120.0	1.34

Probably slow retrograde motion.

10846 A. G. Clark. τ *Cygni*

R.A. $21^h\ 10^m\ 0^s$ Decl. + 37° 32′

1911.489	229°.7	0″.83
11.514	231.9	0.86
12.727	218.7	0.80
12.730	217.7	0.95
12.801	221.6	1.04
1912.252	223.9	0.90

On 1912.801 A appeared elongated. It is perhaps double.

10854 Σ 2783

R.A. $21^h\ 10^m\ 48^s$ Decl. + 57° 48′

1910.796	24°.5	0″.92
11.470	24.7	1.04
11.489	24.3	1.03
1911.252	24.5	1.00

Retrograde motion.

.... SD − 21° (5981) (9.1 ... 10.0)

R.A. $21^h\ 11^m\ 7^s$ Decl. − 21° 45′

1911.629	197°.6	17″.39
11.634	197.6	17.41
11.670	197.6	17.50
1911.644	197.6	17.43

10858 H 1630

R.A. $21^h\ 11^m\ 9^s$ Decl. + 56° 32′

1911.708	127°.9	18″.88
11.812	127.6	19.04
11.823	128.1	18.98
1911.781	127.9	18.97

1908.71 128°.1 18″.55 3n Bies

[Van Biesbroeck (*Ann. Observ. Belgique*, N. S. XIII)]

No early measures.

10862 H 1631

R.A. $21^h\ 11^m\ 15^s$ Decl. + 50° 47′

1912.678	16°.7	49″.31
12.683	17.0	49.34
12.691	17.0	49.21
1912.684	16.9	49.29

No measures prior to 1902.

10868 H 3019

R.A. $21^h\ 12^m\ 2^s$ Decl + 9° 22′

1910.769	310°.0	16″.30
10.775	310.1	16.38
10.777	309.5	16.40
1910.774	309.9	16.36

1912.59 310°.3 16″.32 3n Woods

[Woods (*A. J.* 644)]

There are no early measures.

10870 Es 97

R.A. $21^h\ 12^m\ 8^s$ Decl. + 44° 18′

1911.541	291°0	7″54
11.561	288.8	7.35
11.566	291.0	7.48
1911.556	290.3	7.46

1910.89 289°0 7″07 3n Woods

[Woods (*A. J.* 644)]

Espin's distance for 1901 is 6″6. There may be some increase.

10872 H 3020 (9.9 ... 9.9)

R.A. $21^h\ 12^m\ 14^s$ Decl. + 9° 11′

1910.769	114°3	26″40
10.775	294.8	26.46
10.777	114.7	26.44
1910.774	114.6	26.43

1911.82 114°5 26″05 3n Woods

[Woods (*A. J.* 644)]

No early measures. This star is not in BD, but is 5^s *f* and 434″ *n* of H 3021.

10876 H 3021. BD 8° (4645) (9.7 ... 10.2)

R.A. $21^h\ 12^m\ 9^s$ Decl. + 9° 4′

1910.769	237°6	23″30
10.775	237.9	23.21
10.777	237.7	23.30
1910.774	237.7	23.27

1911.85 237°9 23″56 3n Woods

[Woods (*A. J.* 644)]

No early measures.

10885 OΣ 433. *v Cygni*

R.A. $21^h\ 12^m\ 59^s$ Decl. + 34° 24′

A and B

1912.683	219°9	14″90
12.686	219.0	15.23
12.749	218.3	15.23
13.023	218.6	15.28
1912.785	218.9	15.16

A and C

1912.683	180°1	21″12
12.686	180.6	21.61
12.749	179.0	21.72
13.023	181.9	21.31
1912.785	180.4	21.44

Star (12.5) in 309° : 1′. The system is without change.

10891 β 289

R.A. $21^h\ 13^m\ 22^s$ Decl. + 34° 25′

1912.801	138°4	0″88
15.602	136.2	0.96
1914.201	137.3	0.92

Without motion.

10894 H 1634 (9.0 ... 9.2)

R.A. $21^h\ 13^m\ 45^s$ Decl. + 42° 13′

1911.591	137°4	27″05
11.812	137.6	26.95
11.927	138.2	27.01
1911.777	137.7	27.00

1910.88 137°6 26″69 3n Woods

[Woods (*A. J.* 644)]

No early measures.

10895 Hu 86

R.A. $21^h\ 13^m\ 46^s$ Decl. − 11° 19′

1910.753	236°3	4″42
10.898	235.7	4.08
12.683	235.9	4.26
1911.445	236.0	4.25

Star (12.0) in 197° : 37″. As yet there is no change.

10901 A. G. 270

R.A. $21^h\ 14^m\ 13^s$ Decl. + 38° 39′

1911.566	114°2	5″76
11.577	113.3	5.76
11.591	111.5	5.80
1911.578	113.0	5.77

Fixed.

10906 See 441

R.A. 21h 14m 32s Decl. − 25° 13′

A and B

1911.634	13°.6	1″.93
11.673	13.2	1.80
12.839	13.2	1.74
1912.049	13.3	1.82

Probably unchanged.

A and C

1911.634	317°.3	108″.44
11.673	317.3	108.27
1911.653	317.3	108.35

Not previously observed.

10909 Ho 155

R.A. 21h 14m 39s Decl. + 32° 45′

1911.654	32°.2	2″.30
11.717	30.5	2.17
11.722	30.4	2.15
1911.698	31.0	2.21

Entirely fixed.

.... BD 42° (4055) (9.3 ... 9.7)

R.A. 21h 14m 53s Decl. + 42° 23′

1911.812	306°.5	12″.42
11.927	307.1	12.14
12.623	305.8	12.42
1912.121	306.5	12.33

nf **10894** = H 1634.

10919 β 1262

R.A. 21h 15m 40s Decl. − 15° 26′

1908.644	113°.4	2″.02	40
08.698	114.9	1.93	40
08.717	113.5	1.87	40
1908.686	113.9	1.94	

Unaltered.

10922 OΣ 437

R.A. 21h 15m 46s Decl. + 31° 57′

1911.632	39°.7	1″.93
11.654	41.0	1.78
11.673	36.8	1.88
1911.653	39.2	1.86

The motion is essentially rectilinear. The character is still uncertain.

10925 Σ 2790 (6.5 ... 9.5)

R.A. 21h 15m 55s Decl. + 58° 7′

1911.708	42°.7	4″.67
11.927	45.7	4.59
12.434	41.4	4.76
12.437	42.3	4.78
1912.127	43.0	4.70

The principal star is very red. Spectrum M_a. No indication of motion.

A and C

1911.851	350°.9	74″.47
12.434	350.9	74.23
12.437	350.8	74.39
1912.241	350.9	74.36

10934 Holmes

R.A. 21h 16m 39s Decl. + 58° 11′

1911.708	64°.4	12″.81
11.812	64.9	12.72
11.927	63.8	12.81
1911.816	64.4	12.78

The angle is reversed.

10943 S 788

R.A. 21h 17m 31s Decl. − 7° 6′

1911.654	89°.1	45″.66
11.670	88.6	45.60
11.728	89.0	45.89
1911.684	88.9	45.72

The change is due to proper motion.

.... SD − 15° (5979) (10.0 ... 10.3)

R.A. 21h 18m 17s Decl. − 15° 6′

1908.644	28°.2	11″.96	40
08.698	27.7	11.86	40
15.506	26.9	11.87	
1910.949	27.6	11.90	

10958 Howe 56

R.A. 21h 19m 39s Decl. − 20° 57′

See **10975**, Hn 166 on page 40.

10959 H 1641

R.A. 21ʰ 18ᵐ 34ˢ Decl. + 23° 46′

1912.749	311°0	52″99
12.812	310.9	52.34
12.823	310.6	52.55
1912.795	310.8	52.63

The measures of distance are not in good agreement. Possibly some change.

10978 H 1644

R.A. 21ʰ 20ᵐ 18ˢ Decl. + 47° 30′

1912.678	119°1	24″68
12.754	118.5	24.37
12.820	119.0	24.56
1912.751	118.9	24.54

There are no early measures. Star (12.2) in 43° : 36″.

11001 Σ 2799. *Pegasi* 20

R.A. 21ʰ 23ᵐ 2ˢ Decl. + 10° 34′

A and B

1912.683	295°1	1″66
12.697	293.7	1.56
12.708	294.9	1.51
1912.696	294.6	1.58

The character of the motion is still uncertain. Many recent observations.

A and C (9.5)

1912.683	336°3	136″33
12.697	336.2	136.01
1912.690	336.2	136.17

No prior measures.

11020 Es 99

R.A. 21ʰ 24ᵐ 43ˢ Decl. + 44° 28′

1912.623	206°1	5″65
15.596	206.2	5.46
1914.109	206.1	5.55

Espin's measures of both angle and distance give low values.

11021 Es 100

R.A. 21ʰ 24ᵐ 51ˢ Decl. + 44° 41′

A and B

1910.553	157°3	4″18
10.720	157.0	4.18
10.895	159.8	4.17
12.623	159.1	4.32
1911.198	158.3	4.21

No change. Woods gives (*A. J.* 644):

1912.56	159°0	4″16	3n

A and C (11.5)

1912.623	339°2	30″07
12.913	338.4	29.80
1912.768	338.8	29.93

There are no prior measures.

11044 Hu 593

R.A. 21ʰ 26ᵐ 54ˢ Decl. + 49° 36′

1911.498	56°3	1″63
11.500	59.5	1.56
11.506	59.3	1.59
1911.501	58.4	1.59

No motion.

11048 A. G. 272

R.A. 21ʰ 27ᵐ 8ˢ Decl. + 44° 37′

1910.559	183°5	4″04
10.720	182.8	4.10
10.895	184.2	4.11
1910.725	183.5	4.08

No evidence of motion.

11051 Σ 2804. *Pegasi* 29

R.A. 21ʰ 27ᵐ 26ˢ Decl. + 20° 11′

1912.812	337°4	3″06
12.823	334.6	2.92
12.839	334.9	3.01
1912.825	335.6	3.00

The character of the motion is uncertain.

11065 H 1659

R.A. $21^h\ 29^m\ 18^s$ Decl. $+58°\ 8'$

1912.754	295°.6	7".35
12.760	295.9	7.32
12.768	295.9	7.35
1912.761	295.8	7.34

Possibly some decrease in angle.

11071 Es 33

R.A. $21^h\ 29^m\ 58^s$ Decl. $+49°\ 57'$

1911.495	93°.1	4".21
11.498	92.7	4.20
11.500	92.8	4.27
1911.498	92.9	4.23

Probably unchanged.

11120 Es 34

R.A. $21^h\ 32^m\ 51^s$ Decl. $+50°\ 0'$

A and B

1909.616	134°.7	2".75	40
09.739	135.0	....	
09.742	134.7	2.69	
11.495	134.9	2.08	
1910.148	134.8	2.51	

Possibly diminished angle.

A and C

1909.616	69°.8	39".68	40
09.739	69.6	39.83	
09.742	69.7	39.67	
11.495	70.0	39.70	
1910.148	69.8	39.72	

Apparently fixed.

11121 β 371

R.A. $21^h\ 32^m\ 58^s$ Decl. $+58°\ 10'$

1912.754	2°.2	8".71
12.760	2.2	8.70
12.768	2.2	8.55
1912.761	2.2	8.65

No motion.

11123 H 1671

R.A. $21^h\ 33^m\ 0^s$ Decl. $+50°\ 18'$

1911.498	324°.9	9".69
11.500	324.9	9.79
11.506	325.3	9.71
1911.501	325.0	9.73

No early measures for comparison.

11128 Es 102

R.A. $21^h\ 33^m\ 36^s$ Decl. $+45°\ 57'$

1911.621	35°.1	11".59
11.667	34.0	11.50
11.812	35.7	11.50
1911.700	34.9	11.53

Apparently fixed.

11137 A. G. 274

R.A. $21^h\ 34^m\ 6^s$ Decl. $+22°\ 49'$

A and B

1912.812	153°.9	9".22
12.823	154.9	9.17
12.861	154.5	9.17
1912.832	154.4	9.19

1910.68	154°.0	9".10	3n	Do

[Doberck (*A. N.* 4480)]

Probably unchanged.

A and C (10.3)

1912.812	158°.3	61".99
12.823	158.6	61.78
12.861	158.4	62.06
1912.832	158.4	61.94

No prior observations.

11152 Ho 464

R.A. $21^h\ 34^m\ 55^s$ Decl. $-15°\ 23'$

1908.785	105°.6	18".03	12
09.975	107.1	17.99	
1909.380	106.3	18.01	

1906.62	103°.9	17".55	3n	Doo
1908.65	104.1	17.73	3n	β

[Doolittle (*Pub. Flower Obsy.* III) . . . β (*Carnegie Inst.* 168)]

Slow increase in distance.

11202 Es 141

R.A. $21^{h}\ 38^{m}\ 0^{s}$ Decl. + 60° 40′

1911.621	180°3	1″91
11.673	184.0	2.00
11.717	186.4	1.88
11.722	186.0	1.94
1911.683	184.2	1.93

No evidence of motion.

11214 Σ 2822. *μ Cygni*

R.A. $21^{h}\ 38^{m}\ 46^{s}$ Decl. + 28° 12′

1907.720	124°3	2″53	12
07.731	124.8	2.32	12
07.755	124.6	2.26	12
1907.735	124.6	2.37	

Frequently observed since β G. C.

11217 β 374

R.A. $21^{h}\ 38^{m}\ 59^{s}$ Decl. + 50° 27′

1909.711	142°4	1″93
09.967	141.3	1.71
09.973	135.9	1.75
1909.884	139.9	1.80

Fixed.

11262 H 1694

R.A. $21^{h}\ 42^{m}\ 23^{s}$ Decl. + 57° 14′

A and B

1911.621	13°6	19″84
11.667	13.8	19.95
11.927	13.8	19.81
1911.738	13.7	19.87

No measures prior to 1900.

B and C = Espin 36

1911.621	137°9	6″99(a)
11.927	141.9	6.97
1911.774	139.9	6.98

(a) C very faint.
No change.

11343 β 841

R.A. $21^{h}\ 49^{m}\ 21^{s}$ Decl. + 53° 43′

1912.689	192°8	2″12
12.691	193.0	2.26
12.760	193.3	2.18
1912.713	193.0	2.19

Comstock's star nearby is possibly identical with **11318** = Hn 50. See page 41.

11407 Es 145

R.A. $21^{h}\ 53^{m}\ 30^{s}$ Decl. + 62° 7′

1910.559	200°5	2″86
10.758	200.5	3.06
10.788	201.4	2.82
1910.702	200.8	2.91

The measures of angle are discordant.

11483 Σ 2863. *ξ Cephei*

R.A. $22^{h}\ 0^{m}\ 18^{s}$ Decl. + 64° 2′

1908.373	282°1	6″97	40
08.583	283.2	7.02	40
08.613	282.4	6.92	12
1908.523	282.6	6.97	

A well-known system of the 61 *Cygni* type. Abundantly measured.

11485 H 1721

R.A. $22^{h}\ 0^{m}\ 20^{s}$ Decl. + 29° 19′

1910.378	273°8	9″50
10.444	274.8	9.13
10.449	273.5	9.33
1910.424	274.0	9.32

The distance is slowly increasing.

11490 Σ 2862

R.A. $22^{h}\ 0^{m}\ 57^{s}$ Decl. − 0° 1′

1907.638	100°1	2″76	12
07.692	101.1	2.71	12
07.695	100.7	2.48	12
1907.675	100.6	2.65	

Little if any change.

11494 Es 103

R.A. $22^h\ 1^m\ 6^s$ Decl. + 53° 48′

1910.553	207°.9	1″.83
10.796	207.6	1.81
11.495	207.9	1.74
1910.948	207.8	1.79

Espin's original measures yield:

1901 213°.6 1″.6 9.1 ... 9.3

11514 Σ 2873

R.A. $22^h\ 2^m\ 40^s$ Decl. + 82° 18′

1908.373	72°.7	13″.88	40
08.583	72.7	13.61	40
08.613	74.4	13.65	12
1908.613	73.3	13.71	

Little if any relative motion.

11515 Hu 284 = 11518 Hu ——

R.A. $22^h\ 2^m\ 45^s$ Decl. − 19° 34′

1910.722	112°.5	3″.53
10.733	112.7	3.32
10.742	112.1	3.41
1910.732	112.4	3.42

No change since the first measures of 1900.

11544 Hu 285

R.A. $22^h\ 4^m\ 45^s$ Decl. − 15° 25′

1910.722	117°.6	2″.14
10.742	116.2	2.18
10.884	117.5	2.03
1910.783	117.1	2.12

As yet no change.

.... A 1455. BD 39° (4772) (9.0 ... 10.6)

R.A. $22^h\ 5^m\ 5^s$ Decl. + 39° 29′

1911.634	107°.6	1″.02
11.651	108.9	0.96
11.673	103.3	0.90
11.722	104.3	0.89
1911.670	106.0	0.94

1906.59 103°.2 0″.84 3n A

[Aitken (*Bull. L. O.* 109)]

11551 Es ——. BD 63° (1814)

R.A. $22^h\ 5^m\ 46^s$ Decl. + 63° 29′

1911.621	237°.5	6″.34
11.706	239.2	6.41
12.680	238.5	6.34
1912.002	238.4	6.36

There are no early measures.

11556 OΣ 464

R.A. $22^h\ 6^m\ 9^s$ Decl. + 39° 35′

1911.651	66°.0	0″.43
11.673	61.4	0.42
11.722	63.1	....
11.780	68.0	0.45
1911.706	64.6	0.43

Direct motion.

11559 H 1741

R.A. $22^h\ 6^m\ 29^s$ Decl. + 50° 14′

1911.569	307°.3	26″.55
11.604	306.5	26.52
11.621	305.8	26.56
1911.598	306.5	26.54

1908.63 306°.6 26″.07 3n β

β (*Carnegie Inst.* 168)]

β gives the proper motion as:

0″.160 in 76°.0.

11569 Σ 2879

R.A. $22^h\ 7^m\ 18^s$ Decl. + 62° 48′

1911.706	231°.3	0″.80
12.680	224.9	0.75
12.730	231.7	0.88
1912.372	229.3	0.81

Two faint stars near and in opposite direction. No appreciable motion.

11581 H 1745 (10.2 ... 10.2)

R.A. $22^h\ 7^m\ 52^s$ Decl. + 13° 30′

1909.867	359°.4	15″.43
10.518	178.9	15.14
10.733	359.9	15.31
10.742	359.4	15.40
1910.465	359.4	15.32

8′ north of BD 13° (4874). No early measures.

11583 O. Stone 57. SD − 20° (6379)

R.A. $22^{h}\ 6^{m}\ 10^{s}$ Decl. − 20° 42′

1910.753	96°.2	10″.28
10.769	97.0	10.22
10.775	96.0	10.36
1910.766	96.4	10.29

Apparently unchanged.

11587 Es 146

R.A. $22^{h}\ 8^{m}\ 6^{s}$ Decl. + 52° 17′

1910.518	48°.3	2″.80
10.559	225.6	2.63
10.709	48.1	2.70
1910.595	47.3	2.71

Comparison with Espin's measures shows decided change:

1902	8°.4	2″.7	1n	Es

Espin adds the note "poor measure." Possibly typographical error in angle.

11590 Σ 2878. *Pegasi* 148

R.A. $22^{h}\ 8^{m}\ 31^{s}$ Decl. + 7° 23′

1907.695	125°.3	1″.39	12
07.720	125.5	1.72	12
07.731	126.2	1.40	12
1907.715	125.7	1.50	

Very slow retrograde motion.

11592 Σ 2877

R.A. $22^{h}\ 8^{m}\ 33^{s}$ Decl. + 16° 36′

1910.482	4°.8	12″.70
10.487	3.9	12.98
10.493	3.8	12.87
1910.487	4.2	12.85

Colors, yellow and blue. Change due to proper motion.

11599 Σ 2881 = S 807

R.A. $22^{h}\ 9^{m}\ 6^{s}$ Decl. + 28° 59′

1910.473	99°.5	1″.68
10.493	97.0	1.68
10.496	98.7	1.71
1910.487	98.4	1.69

Retrograde motion.

11601 A. G. 281

R.A. $22^{h}\ 9^{m}\ 9^{s}$ Decl. + 21° 21′

1910.482	17°.6	2″.80
10.487	20.2	2.51
10.493	15.9	2.73(a)
10.509	19.0	2.61
1910.493	18.2	2.66

(a) Seeing poor. Thick. Very faint.
Change is uncertain.

11602 OΣ 467 *rej.* = H 959 = Ho 613

R.A. $22^{h}\ 9^{m}\ 10^{s}$ Decl. + 21° 56′

1910.482	273°.1	23″.08
10.487	272.5	23.42
10.509	272.9	22.96
1910.493	272.8	23.15

Apparently without motion.

11603 Ho 472 (8.9 ... 11.5)

R.A. $22^{h}\ 9^{m}\ 15^{s}$ Decl. − 23° 19′

1910.753	243°.1	4″.48
15.599	242.3	4.56
1913.176	242.7	4.52

Change is doubtful.

11610 H 3101

R.A. $22^{h}\ 10^{m}\ 9^{s}$ Decl. + 11° 53′

1911.591	324°.5	18″.77
11.599	324.4	18.76
11.604	325.2	18.96
1911.598	324.7	18.83

No early measures. Not in BD but near BD + 11° (4764 ... 4768).

.... BD 61° (2268) (8.9 ... 10.4)

R.A. $22^{h}\ 10^{m}\ 23^{s}$ Decl. + 61° 19′

1911.500	174°.6	5″.71
11.506	174.0	5.59
11.514	174.5	5.54
1911.507	174.4	5.61

sp **11635** = Kr 57.

11612 Ho 614

R.A. $22^h\ 10^m\ 24^s$ Decl. $+50°\ 53'$

1910.518	174°.5	4″.79
10.553	173.2	4.84
10.709	172.4	5.10
1910.593	173.4	4.91

Unaltered.

11614 β 477

R.A. $22^h\ 10^m\ 28^s$ Decl. $+30°\ 49'$

1911.561	43°.7	6″.57
11.563	41.3	6.54
11.566	43.6	6.63
1911.563	42.9	6.58

Apparently unchanged.

11615 H 3102

R.A. $22^h\ 10^m\ 29^s$ Decl. $+1°\ 11'$

1911.563	173°.4	17″.26
11.566	353.1	17.20
11.591	352.8	17.11
1911.573	353.1	17.19

No early measures. The magnitudes are equal.

11620 Ho 180

R.A. $22^h\ 10^m\ 49^s$ Decl. $+43°\ 18'$

1911.514	228°.1	0″.64
11.517	223.9	0.60
11.602	226.1	0.67
1911.544	226.0	0.64

No evidence of motion.

11629 A 184

R.A. $22^h\ 12^m\ 14^s$ Decl. $+45°\ 57'$

1912.593	312°.2	2″.52
12.615	313.0	2.73
12.623	311.8	2.67
1912.610	312.3	2.64

Aitken's measures give:

1900.90	314°.6	2″.20	3n

11633 H 3104

R.A. $22^h\ 12^m\ 35^s$ Decl. $-17°\ 42'$

1911.563	75°.4	10″.63
11.566	75.3	10.36
11.599	75.2	10.43
1911.576	75.3	10.47

No change in the last decade.

11635 Kr 57

R.A. $22^h\ 12^m\ 48^s$ Decl. $+61°\ 26'$

1911.498	223°.3	1″.72
11.500	223.5	1.68
11.506	227.0	1.74
11.514	227.6	1.71
1911.504	225.4	1.71

1909.73	228°.3	1″.73	4n	Do

[Doberck (*A. N.* 4395)]

Apparently fixed.

11636 β 378

R.A. $22^h\ 12^m\ 50^s$ Decl. $+60°\ 16'$

A and B

1911.517	90°.4	3″.31
11.574	89.6	3.29
11.577	90.1	3.37
1911.556	90.0	3.32

No appreciable change.

A and C

1911.517	29°.6	7″.26
11.574	30.4	7.29
11.577	29.5	7.46
1911.556	29.8	7.34

No motion since discovery.

11650 β 1216

R.A. $22^h\ 14^m\ 42^s$ Decl. $+28°\ 55'$

1911.602	304°.1	0″.66
11.651	306.8	0.68
11.949	301.3	0.60
1911.734	304.1	0.65

Probably retrograde motion.

11651 H 5329

R.A. $22^h\ 14^m\ 47^s$ Decl. − 4° 10′

1911.563	100°.4	8″.19
11.566	100.1	8.13
11.599	100.0	8.24
1911.576	100.2	8.19

No early measures.

11657 Σ 2895

R.A. $22^h\ 15^m\ 8^s$ Decl. + 24° 21′

1910.722	34°.8	8″.38
10.744	33.7	8.30
10.747	34.1	8.38
1910.738	34.2	8.35

1912.62	36°.3	8″.38	3n	β

[β (*Carnegie Inst.* 168)]

Change due to proper motion.

11673 Σ 2899 *rej.*

R.A. $22^h\ 16^m\ 33^s$ Decl. + 5° 52′

1910.747	33°.6	18″.65
10.775	31.1	18.40
10.793	30.6	18.70(a)
11.561	32.2	.....
1910.969	31.9	18.58

(a) Very thick. Poor seeing.

There are no measures earlier than 1904. Faint star (12.8) 22″ *p*.

11682 Ho 292

R.A. $22^h\ 17^m\ 13^s$ Decl. + 5° 3′

1910.775	62°.4	4″.29
10.793	63.7	4.56
10.865	64.3	4.57
1910.811	63.5	4.47

Possibly some increase in distance.

11687 Ho 182

R.A. $22^h\ 17^m\ 37^s$ Decl. + 16° 57′

1910.753	133°.2	1″.81
10.775	312.3	1.78
10.777	308.3	1.60(a)
10.793	130.5	1.68
1910.774	131.1	1.72

(a) Very thick. Very faint.

Immobile.

11688 H 3109. BD 10° (4742)

R.A. $22^h\ 16^m\ 0^s$ Decl. + 53° 13′

1911.563	301°.8	27″.90
11.566	301.4	27.97
11.577	301.7	28.12
1911.568	301.6	28.00

There are no early measures.

11690 Σ 2900

R.A. $22^h\ 17^m\ 52^s$ Decl. + 20° 15′

1910.739	172°.4	1″.68
10.884	170.7	1.56
11.492	173.3	1.62
1911.038	172.1	1.62

The measures of this pair are quite discordant.

11691 β 172. 51 *Aquarii*

R.A. $22^h\ 17^m\ 52^s$ Decl. − 5° 27′

1911.492	355°.1	0″.64
11.498	355.4	0.59
11.602	355.2	0.60
1911.531	355.2	0.61

From Aitken's fine series of measures (*Pub. L. O.* XII) the following are taken:

1909.67	355°.8	0″.54	2n
1912.72	356.0	0.66	2n

Slow retrograde motion.

11692 A 629

R.A. $22^h\ 17^m\ 58^s$ Decl. + 59° 23′

1912.730	330°.0	1″.10(a)
12.801	331.9	1.05
12.877	331.7	1.02
1912.803	331.2	1.06

(a) Gale from S. E.

As yet no motion.

11693 Hu 493

R.A. $22^h\ 17^m\ 59^s$ Decl. + 18° 37′

1911.602	165°.2	0″.67
11.629	166.0	0.69
11.651	164.7	0.70
1911.627	165.3	0.69

The original measures are:

1901.65	167°.7	0″.78	3n

11700 H 1762

R.A. 22^{h} 18^{m} 28^{s} Decl. + 47° 48′

1911.667	354°.3	18″.34
11.708	174.8	18.25
12.615	355.9	18.51
1911.997	355.0	18.37

No early measures.

11701 Weisse 38

R.A. 22^{h} 18^{m} 31^{s} Decl. + 40° 18′

A and B

1911.561	53°.3	6″.89
11.566	53.2	6.84
11.569	53.6	6.86
1911.565	53.4	6.86

Fixed.

A and C

1911.561	3°.1	43″.99
11.566	3.5	43.96
1911.563	3.3	43.97

Several faint stars nearer.

11702 Σ 2902

R.A. 22^{h} 18^{m} 32^{s} Decl. + 44° 45′

1908.879	88°.2	6″.55	40
08.882	87.3	6.47	12
08.884	87.5	6.52	12
08.917	88.7	6.57	40
1908.890	87.9	6.53	

Fixed.

.... BD 37° (4562) (9.5 ... 12.0)

R.A. 22^{h} 18^{m} 55^{s} Decl. + 37° 38′

A and B

1911.656	248°.8	6″.54
15.618	250.9	6.28
1913.637	249.9	6.41

A and C

1911.656	70°.2	15″.20
12.667	71.4	15.11
12.820	70.7	15.00
1912.381	70.8	15.10

sp **11724** = Ho 185.

11714 Es 147

R.A. 22^{h} 19^{m} 54^{s} Decl. + 54° 16′

A and B

1910.559	25°.0	2″.46
10.709	20.4	2.58
10.758	20.4	2.63
10.796	22.9	....
1910.706	22.2	2.56

Probably unchanged. See Aitken (*Pub. L. O.* XII).

A and C

1910.559	205°.5	30″.16
10.709	206.0	30.50
10.758	205.8	30.32
1910.675	205.8	30.33

Probably increasing distance.

11715 Sh 345. 53 *Aquarii*

R.A. 22^{h} 20^{m} 3^{s} Decl. − 17° 21′

1910.838	308°.8	6″.75
10.848	308.8	6.65
10.851	308.6	6.65
1910.846	308.7	6.68

Change from difference in proper motions.

.... Es 687. BD 47° (3792) (8.8 ... 9.1)

R.A. 22^{h} 20^{m} 41^{s} Decl. + 47° 31′

1911.708	88°.1	4″.50		
12.615	268.0	4.42		
12.623	266.6	4.60		
1912.315	267.6	4.51		
1908.75	269°.6	4″.92	2n	Es

[Espin (*M. N.* LXIX, 225)]

11719 Hu 596

R.A. 22^{h} 20^{m} 43^{s} Decl. + 18° 48′

1911.656	15°.2	1″.14
11.670	14.7	1.19
11.673	15.2	1.17
1911.666	15.0	1.17

Unchanged.

11724 Ho 185

R.A. 22ʰ 21ᵐ 15ˢ Decl. + 38° 1′

A and B

1911.656	171°3	2″79
12.667	173.5	2.76
12.820	179.9	2.64
1912.381	174.9	2.73

The angle exhibits decided increase.

A and C (8.0)

1912.667	81°4	92″36
12.820	81.4	92.30
1912.743	81.4	92.33

C has not been measured previously.

11737 Σ 2908

R.A. 22ʰ 22ᵐ 22ˢ Decl. + 16° 39′

1911.561	115°8	9″14
11.563	115.3	9.26
11.566	114.6	9.14
1911.563	115.2	9.18

No evidence of motion.

11738 β 173

R.A. 22ʰ 22ᵐ 24ˢ Decl. + 56° 35′

1911.667	238°1	3″16
11.673	234.6	2.91
11.706	228.9	2.95
11.714	229.5	2.97
1911.690	232.8	3.00

Apparently fixed.

11741 Σ 2910

R.A. 22ʰ 22ᵐ 31ˢ Decl. + 22° 55′

1911.561	337°2	5″49
11.566	337.7	5.37
11.577	337.6	5.51
1911.568	337.5	5.46

Slow retrograde motion. In β G. C. I the angle should be 347°2.

11743 Σ 2909. *ζ Aquarii*

R.A. 22ʰ 22ᵐ 39ˢ Decl. − 0° 38′

1907.638	314°0	3″27	12
07.692	315.0	3.38	12
07.695	315.5	3.14	12
11.602	310.4	3.00	
11.621	311.1	3.26	
11.629	311.0	2.95	
11.654	308.5	3.13	
1907.675	314.8	3.26	
1911.626	310.2	3.09	

Retrograde motion of uncertain character.

11747 Hd Zones = Ku 65 (9.5 . . . 9.7)

R.A. 22ʰ 22ᵐ 53ˢ Decl. + 0° 40′

A and B

1912.579	179°5	3″19
12.584	180.2	3.28
12.623	179.8	3.29
1912.595	179.8	3.25

1906.77	182°2	3″02	3n	Morgan

[Morgan (*A. J.* 593)]

Without motion.

A and C (9.6)

1912.579	186°0	93″43
12.584	186.0	93.43(a)
12.623	186.0	93.51
1912.595	186.0	93.46

(a) Objective fogged.

Not previously measured. Star (12.5) in 342° : 22″.

11748 Kr 59

R.A. 22ʰ 22ᵐ 53ˢ Decl. + 63° 6′

1911.541	340°4	1″90
11.566	341.7	1.87
11.574	340.1	1.81
1911.560	340.7	1.86

The quadrant is reversed.

11749 H 964. BD 9° (5051)

R.A. $22^h\ 22^m\ 56^s$ Decl. + 9° 48′

1911.632	147°9	15″28
11.670	145.6	15.48
11.785	148.6	15.33(a)
1911.696	147.4	15.36

(a) Fog. Faint.
No early measures.

11761 Kr 60

R.A. $22^h\ 23^m\ 43^s$ Decl. + 57° 6′

A and B

1911.673	90°5	3″04
11.706	88.2	2.97
11.714	90.9	3.15
1911.698	89.9	3.05

A and C

1911.673	59°5	46″57
11.706	59.3	46.67
11.714	59.4	46.69
1911.698	59.4	46.64

The character of the star is too well known to need comment. There are many recent observations.

11762 A 783. BD 70° (1233)

R.A. $22^h\ 20^m\ 10^s$ Decl. + 70° 17′

1911.667	181°1	4″45
11.673	182.7	4.36
11.708	180.8	4.42
1911.683	181.5	4.41

No change. Aitken gives an incorrect identification. BD 70° (1241) is, however, double. (See Fox 46 on page 228.)

11789 Σ 2915

R.A. $22^h\ 26^m\ 33^s$ Decl. + 6° 48′

1911.708	325°3	12″82
11.714	145.7	12.79
11.785	327.6	12.69
1911.736	326.2	12.77

Change from proper motion.

11790 Es 148

R.A. $22^h\ 26^m\ 39^s$ Decl. + 61° 1′

A and B

1912.760	281°6	3″18
12.845	286.0	3.09
12.877	284.0	3.13
1912.827	283.9	3.13

Unaltered.

A and C (9.0)

1912.760	116°9	89″16
12.798	116.9	88.82
12.845	116.8	89.08
1912.801	116.9	89.02

There are no earlier observations. C is BD 60° (2405) from which the position of A has been derived.

11796 Σ 2919

R.A. $22^h\ 27^m\ 22^s$ Decl. + 20° 33′

1912.579	260°4	17″60(a)
12.584	260.6	17.53(b)
12.593	260.6	17.38
1912.585	260.5	17.50

(a) Dawn. (b) Objective fogged.
Change due to proper motion.

11798 A. G. 283

R.A. $22^h\ 27^m\ 36^s$ Decl. + 54° 35′

1911.667	333°2	3″09
11.673	332.7	2.98
11.708	155.8	2.95
11.714	337.3	3.04
1911.691	334.7	3.02

Apparently fixed.

11828 Σ 2924

R.A. $22^h\ 29^m\ 33^s$ Decl. + 69° 17′

1912.730	274°7	0″40
12.801	273.7	0.45
1912.865	274.2	0.42

Direct motion with decreasing distance.

11839 Σ 2922. 8 *Lacertae*

R.A. 22^{h} 30^{m} 32^{s} Decl. + 39° 1′

1907.638	184°.8	22″.55	12
07.755	185.1	22.46	12
07.758	185.7	22.39	12
1907.717	185.2	22.47	

No evidence of change.

11866 Σ 2928

R.A. 22^{h} 33^{m} 10^{s} Decl. − 13° 14′

1907.692	310°.4	4″.54	12
07.695	310.0	3.97	12
07.701	310.2	4.11	12
1907.696	310.2	4.21	

Retrograde motion.

11882 Es 106

R.A. 22^{h} 34^{m} 5^{s} Decl. + 48° 48′

1910.559	264°.2	8″.15
10.709	266.1	8.16
10.720	265.3	7.92
12.628	267.0	8.04
1911.154	265.6	8.07

No change since 1901. Star (12.3) in 343° : 29″.

11906 Σ 2932

R.A. 22^{h} 35^{m} 50^{s} Decl. + 29° 25′

A and B

1912.678	279°.9	20″.48
12.683	281.5	20.36
12.686	281.3	20.36
1912.682	280.9	20.40

Increase in distance.

A and C

1912.678	12°.5	29″.96(a)
12.683	13.3	30.09
1912.680	12.9	30.02

(a) Very thick. Faint.
First measured in 1905.

.... BD 10° (4831) (9.0 ... 10.6)

R.A. 22^{h} 43^{m} 14^{s} Decl. + 10° 29′

1913.644	274°.7	13″.52
13.647	274.8	13.47
13.671	274.2	13.37
1913.654	274.6	13.45

sf **11943** = β 711. Measured previously by β. See β G. C. II under **12027**.

11997 Σ 2947

R.A. 22^{h} 44^{m} 54^{s} Decl. + 67° 56′

1908.377	63°.5	3″.99	40
08.583	65.8	3.83	40
08.613	242.2	3.86	12
1908.524	63.8	3.89	

Retrograde motion with increasing distance.

12021 Σ 2950

R.A. 22^{h} 46^{m} 40^{s} Decl. + 61° 3′

1908.373	306°.4	2″.43	40
08.613	305.5	2.09	12
08.630	304.1	2.09	12
1908.539	305.3	2.20	

Retrograde motion with no change in distance. β adds a distant star.

12036 β 382

R.A. 22^{h} 48^{m} 18^{s} Decl. + 44° 7′

1907.731	234°.3	1″.21	12
07.788	235.9	1.21	12
1907.760	235.1	1.21	

Direct motion.

12076 Σ 2961

R.A. 22^{h} 51^{m} 49^{s} Decl. + 62° 14′

1908.373	347°.8	2″.17	40
08.613	346.8	1.89	12
08.630	348.0	2.06	12
1908.539	347.5	2.04	

Fixed.

.... Es 1121. BD 51° (3524)

R.A. $22^h\ 56^m\ 3^s$ Decl. $+52°\ 1'$

1911.706	327°.3	1″.31
11.708	331.1	1.34
11.714	329.8	1.36
1911.709	329.4	1.34

Measured at Espin's request. See *M. N.* LXXII, 195.

12147 Σ 2974 = S 822

R.A. $22^h\ 59^m\ 18^s$ Decl. $+32°\ 44'$

1907.766	159°.1	2″.63	12
07.772	159.2	2.85	12
07.788	158.9	2.72	12
1907.775	159.1	2.73	

Fixed.

12158 Es 107

R.A. $23^h\ 0^m\ 26^s$ Decl. $+49°\ 28'$

1912.628	215°.8	5″.55
12.667	216.2	5.54
12.680	215.8	5.48
1912.658	215.9	5.52

Star (12.7) in 59° : 11″.5. Espin's first observation is:

1901 216°.6 4″.5 8.8 ... 11.0

12168 Hu 94

R.A. $23^h\ 1^m\ 27^s$ Decl. $-10°\ 19'$

1911.714	247°.7	4″.38
11.722	247.7	4.39
12.683	246.1	4.39
1912.040	247.2	4.39

So far no motion.

12169 Σ 2977

R.A. $23^h\ 1^m\ 29^s$ Decl. $+60°\ 48'$

1911.777	345°.4	2″.02
11.785	343.6	2.03
12.680	340.8	2.27
1912.081	343.3	2.11

Apparently fixed. Star (11.3) in 359° : 40″.

12173 Σ 2978

R.A. $23^h\ 1^m\ 43^s$ Decl. $+32°\ 11'$

1907.638	143°.5	8″.89	12
07.720	143.1	8.48	12
07.731	144.5	8.56	12
1907.696	143.7	8.64	

Fixed.

12174 H 3171

R.A. $23^h\ 1^m\ 44^s$ Decl. $-13°\ 43'$

1910.851	40°.2	23″.60
10.865	39.6	23.45
10.870	39.4	23.66
1910.862	39.7	23.57

Herschel's description is:

1830 + 41°.7 20″ ±

12177 β 180

R.A. $23^h\ 2^m\ 9^s$ Decl. $+60°\ 11'$

A and B

1910.717	170°.1	0″.59
11.673	164.9	0.56
11.777	164.9	0.55
1911.389	166.6	0.57

Possibly some change in angle.

AB and C

1911.673	105°.9	34″.25
11.777	106.1	34.40
1911.725	106.0	34.32

No change.

12187 A 311

R.A. $23^h\ 3^m\ 26^s$ Decl. $-4°\ 37'$

1910.722	125°.5	1″.57
10.971	126.3	1.38
11.629	127.9	1.59
1911.107	126.6	1.51

As yet no change.

12190 H 304

R.A. $23^h\ 3^m\ 33^s$ Decl. + 10° 5′

1911.708	169°.8	21″.78
11.714	170.0	21.71
11.834	171.0	21.77
1911.752	170.3	21.75

Herschel's description is:

1820 +	162°.4	15″ ±

.... Storey —— (10.3 ... 11.0)

R.A. $23^h\ 3^m\ 52^s$ Decl. + 50° 48′

1908.717	149°.8	6″.89	40
08.793	150.7	7.15	40
08.870	150.1	7.07	40
08.873	150.4	6.81	40
1908.813	150.2	6.98	

Storey's measures were made a year later than these. The pair is 3^s *f* and 307″ *n* of **12192** = Hn 57.

12196 OΣ 489. *π Cephei*

R.A. $23^h\ 4^m\ 5^s$ Decl. + 74° 44′

1912.730	57°.1	0″.77
12.801	64.7	0.72
12.875	60.7	0.54
1912.802	60.8	0.68

1905.81	53°.9	0″.94	7n	Bies
1908.05	56.6	0.79	3n	Bies
1912.78	72.4	0.75	3n	Bies

[Van Biesbroeck (*A. N.* 4108; *Ann Observ. Belgique*, N. S. XIII)]

Measures of this binary for the next few years will be of great interest.

12203 A 637

R.A. $23^h\ 4^m\ 38^s$ Decl. + 60° 3′

1911.777	319°.6	1″.16
11.785	319.9	1.15
12.680	321.1	1.22
1912.081	320.2	1.18

No motion in the nine years since discovery.

12213 Σ 2988. *Aquarii* 284

R.A. $23^h\ 5^m\ 43^s$ Decl. − 12° 35′

1907.663	279°.1	3″.85	12
07.692	278.9	3.92	12
07.695	278.8	3.86	12
1907.683	278.9	3.88	

Fixed.

12223 H 3177. BD 9° (5185)

R.A. $23^h\ 6^m\ 53^s$ Decl. + 9° 54′

1910.518	180°.2	24″.17
10.523	179.7	23.97
10.529	179.8	24.19
1910.523	179.9	24.11

Herschel's description is:

1830 +	170° ±	25″ ±

12225 Σ 2989

R.A. $23^h\ 7^m\ 13^s$ Decl. + 19° 20′

1909.818	138°.2	1″.56
09.867	140.4	1.59
09.967	140.2	1.46
1909.884	139.6	1.54

Entirely fixed.

12236 H 981. BD 2° (4636)

R.A. $23^h\ 8^m\ 0^s$ Decl. + 2° 13′

1910.898	278°.4	17″.84
10.911	278.1	18.02
10.933	278.2	17.70
1910.914	278.2	17.85

1908.54	280°.6	17″.89	3n	β

[β (*Carnegie Inst.* 168)]

β notes that his measure in β G. C. II belongs to another star.

12259 Hu 597

R.A. $23^h\ 9^m\ 54^s$ Decl. − 18° 23′

1910.747	128°.6	5″.10
10.763	129.1	5.12
10.793	129.4	5.05
1910.768	129.0	5.09

Apparently fixed.

12265 Σ 2995

R.A. $23^h\ 10^m\ 24^s$ Decl. − 2° 15′

1907.663	28°.2	5″.19	12
07.692	29.1	5.21	12
07.695	28.5	5.01	12
10.722	29.5	4.96	
10.884	29.0	4.96	
1908.931	28.8	5.07	

No evidence of motion.

12271 H 1864. BD 41° (4735–36)

R.A. 23^h 11^m 17^s Decl. + 41° 58′

1911.714	206°.8	23″.55
11.785	207.4	23.57
11.793	207.7	23.52
1911.764	207.3	23.55

1910.76	207°.1	23″.29	2n	Lau
1910.86	207.2	23.30	3n	Woods

[Lau (*A. N.* 4488) . . . Woods (*A. J.* 644)]

The only measures are of recent date.

12272 H 3180

R.A. 23^h 10^m 37^s Decl. + 9° 37′

1911.632	261°.8	22″.88
11.665	261.9	23.28(a)
11.708	262.8	22.90
1911.668	262.2	23.02

(a) Very faint. Poor seeing.

1908.65	264°.0	23″.04	3n	β

[β (*Carnegie Inst.* 168)]

No early measures.

12276 β 79

R.A. 23^h 11^m 24^s Decl. – 2° 10′

1910.722	73°.2	1″.02
10.884	73.2	0.98
10.933	71.0	0.98
1910.846	72.5	0.99

Slow retrograde motion with constant distance.

12278 A 419

R.A. 23^h 11^m 34^s Decl. – 6° 13′

1910.722	213°.0	1″.39
10.971	213.1	1.34
11.577	212.1	1.14
1911.090	212.8	1.29

No evidence of change.

12279 β 853

R.A. 23^h 11^m 37^s Decl. + 61° 9′

A and B

1912.730	230°.0	0″.62
15.596	221.2	0.68
15.599	226.4	0.59
1914.642	225.9	0.63

A and C

1912.730	69°.5	6″.83
15.596	68.8	7.03
1914.163	69.2	6.93

The system is without motion.

12282 Hu 598

R.A. 23^h 11^m 44^s Decl. – 17° 0′

1910.722	130°.3	1″.50
11.602	127.6	1.54
11.629	127.6	1.63
1911.318	128.5	1.56

There is no change.

12291 H 1866

R.A. 23^h 12^m 43^s Decl. + 12° 44′

1912.823	152°.3	14″.08
12.836	150.8	14.20
12.839	151.6	14.16
1912.833	151.6	14.15

Herschel gives:

1828 +	160° ±	15″ ±

Not in BD. 31^s.5 *p* and 171″ *s* of **12297** = H 307.

12292 Σ 2998. 94 *Aquarii*

R.A. 23^h 12^m 47^s Decl. – 14° 7′

1907.720	346°.8	13″.49	12
07.731	347.0	13.44	12
07.750	347.3	13.57	12
1907.734	347.0	13.50	

No relative motion.

12293 A 202

R.A. 23^h 12^m 48^s Decl. + 46° 36′

1910.553	255°.5	2″.78
10.709	255.2	2.91
10.758	260.2	2.88
10.777	259.9	....
1910.699	257.7	2.86

1910.77	259°.3	2″.86	2n	Lau

[Lau (*A. N.* 4488)]

Possibly increase in distance.

12297 H 307. BD 12° (4971) (9.3 ... 10.8)

R.A. $23^h\ 13^m\ 15^s$ Decl. + 12° 47′

1911.632	312°5	24″99
11.634	312.8	25.12
11.665	312.2	24.96
1911.644	312.5	25.02

Herschel gives the following:

1820 + 329°0 15″ ± 9–10 ... 11

C and D (11.1 ... 12.1)

1911.632	323°2	14″05
12.790	324.5	14.10
1912.211	323.8	14.07

No prior measures. This is *sf* H 307.

E and F (10.6 ... 11.9)

1911.632	307°4	17″54
12.790	308.3	17.79
1912.211	307.8	17.66

No prior measures. This is *sf* H 307.

12304 Σ 3001. *o Cephei*

R.A. $23^h\ 13^m\ 41^s$ Decl. + 67° 27′

1910.444	198°0	3″07
10.473	197.8	3.00
10.487	198.5	3.25
1910.468	198.1	3.11

Direct motion with increasing distance. Several recent observations. β adds a distant, faint star.

12317 Σ 3006

R.A. $23^h\ 15^m\ 24^s$ Decl. + 34° 47′

1910.449	164°8	5″76
10.487	162.1	5.98
10.518	162.7	5.56
1910.485	163.2	5.77

Retrograde motion with gain in distance. β adds a distant star.

12334 Hu 296

R.A. $23^h\ 16^m\ 56^s$ Decl. − 17° 12′

1911.714	186°6	4″23
12.790	186.3	4.10
12.823	186.6	3.87
1912.442	186.5	4.07

The original measures are:

1900.74 191°2 4″09 2n Hu

12340 Σ 3008

R.A. $23^h\ 17^m\ 32^s$ Decl. − 9° 7′

1910.744	228°9	3″81
10.747	229.8	3.95
10.753	228.2	3.65
1910.748	229.0	3.80

Change due to relative proper motion.

12342 Howe 63

R.A. $23^h\ 17^m\ 38^s$ Decl. − 27° 56′

1910.870	263°0	6″65(a)
10.898	265.0	6.32
11.621	265.3	6.68
1911.130	264.4	6.55

(a) B very faint.
Apparently fixed.

12352 A 789

R.A. $23^h\ 19^m\ 22^s$ Decl. + 68° 38′

1911.541	84°0	1″75
11.566	83.3	1.77
11.574	83.7	1.81
1911.560	83.7	1.78

The mean for the original measures is:

1904.56 79°9 1″58 3n A

Possibly some increase in angle.

12353 H 3192

R.A. $23^h\ 19^m\ 27^s$ Decl. − 17° 35′

1910.766	116°1	27″29
10.793	115.7	27.25
10.829	116.1	27.23
1910.796	116.0	27.26

In good agreement with β:

1908.68 116°5 27″16 3n

[β (*Carnegie Inst.* 168)]

12359 A. G. 292

R.A. $23^{h}\ 19^{m}\ 46^{s}$ Decl. + 32° 47′

1911.561	232°.0	3″.72
11.591	232.2	3.78
11.599	231.8	3.80
1911.584	232.0	3.77

1910.71	232°.6	3″.69	2n	Lau

[Lau (*A. N.* 4488)]

The measures are somewhat conflicting. There is no change.

12362 H 1876

R.A. $23^{h}\ 20^{m}\ 2^{s}$ Decl. + 36° 10′

1911.591	210°.0	9″.38
11.599	29.9	9.42
11.621	209.7	9.35
1911.604	209.9	9.38

The measures of distance are very discordant.

12364 Es 108

R.A. $23^{h}\ 20^{m}\ 4^{s}$ Decl. + 51° 59′

1910.758	245°.1	2″.72
10.777	245.6	2.57
11.541	246.0	2.67
1911.025	245.6	2.65

No change from Burnham's observation of 1906.

12378 Σ 3012

R.A. $23^{h}\ 21^{m}\ 34^{s}$ Decl. + 15° 58′

1910.739	188°.4	2″.82
10.742	188.4	2.79
10.744	188.2	2.97
1910.742	188.3	2.86

No change.

12379 Σ 3013

R.A. $23^{h}\ 21^{m}\ 32^{s}$ Decl. + 15° 58′

1910.739	272°.1	3″.03
10.742	271.8	3.10
10.744	272.4	3.26
1910.742	272.1	3.13

Slight gain in distance.

A of **12379** to A of **12378**

1910.739	246°.2	52″.55
10.742	245.8	52.50
1910.740	246.0	52.53

Possibly slight gain in distance.

12382 H 1883. BD 45° (4229)

R.A. $23^{h}\ 21^{m}\ 54^{s}$ Decl. + 45° 44′

1911.714	145°.7	18″.85
11.785	146.6	18.85
11.793	146.8	18.76
1911.764	146.4	18.82

Herschel gives:

1828 +	154°.6	15″ ±	9 ... 9 +

12386 Σ 3015

R.A. $23^{h}\ 22^{m}\ 10^{s}$ Decl. + 32° 54′

1910.747	186°.0	2″.97
10.947	186.7	2.89
11.561	6.7	3.03
1911.085	186.5	2.96

These measures indicate lessening angle.

12400 H 3197

R.A. $23^{h}\ 23^{m}\ 51^{s}$ Decl. − 17° 57′

1910.829	307°.4	8″.38
10.851	307.2	8.46
10.870	305.6	8.61
1910.850	306.7	8.48

Since 1879 no change.

12403 Ho 200

R.A. $23^{h}\ 24^{m}\ 19^{s}$ Decl. + 85° 45′

1912.678	140°.9	2″.46
12.730	141.4	2.54
12.801	143.5	2.48(a)
1912.736	141.9	2.49

(a) B very faint.

Probably fixed.

12405 OΣ 496

R.A. $23^h\ 24^m\ 29^s$ Decl. + 57° 53′

C and D = Dawes 2

1912.678	223°.1	1″.71
15.596	220.6	1.66
15.599	221.5	1.54
1914.624	221.7	1.64

A and C = ♅ VI 25 = Sh 355 = OΣ (App) 247

1912.678	269°.0	75″.76
15.596	269.0	75.70
1914.137	269.0	75.73

A and G

1912.678	347°.7	66″.91
15.596	347.6	67.02
1914.137	347.6	66.96

G and F = H 1887 (10.7 ... 11.0)

1912.678	252°.1	10″.95
15.596	253.3	10.74
1914.137	252.7	10.84

12409 Σ 3020

R.A. $23^h\ 25^m\ 4^s$ Decl. + 18° 7′

1910.870	110°.1	2″.26
10.898	108.1	2.30
10.911	.....	2.37
10.933	107.5	2.12
1910.903	108.6	2.26

Little change if any.

12417 H 3199

R.A. $23^h\ 25^m\ 53^s$ Decl. − 27° 23′

1910.870	208°.0	32″.94
10.898	208.1	32.50
11.665	208.4	32.39
1911.144	208.2	32.61

Herschel's description is:

1830 +	204°.9	35″ ±	8 ... 10

12421 Es 109

R.A. $23^h\ 26^m\ 16^s$ Decl. + 53° 21′

1908.698	43°.8	6″.32	40
08.717	42.3	6.21	40
1908.707	43.0	6.26	

Change is uncertain.

12424 A 421

R.A. $23^h\ 26^m\ 34^s$ Decl. − 8° 41′

1912.683	111°.3	1″.17
12.686	113.2	1.07
12.727	110.2	1.05
1912.699	111.6	1.10

Star (10.5) in 302° : 60″.

1907.75	106°.2	1″.14	6n	Ol, Wil

Olivier, Wilson (*A. N.* 4227)]

Thus far no motion.

12427 A. G. 293

R.A. $23^h\ 27^m\ 6^s$ Decl. + 56° 51′

1911.541	19°.8	3″.71
11.566	20.6	3.73
11.569	19.7	3.67
1911.559	20.0	3.70

1910.82	25°.1	3″.87	2n	Lau

[Lau (*A. N.* 4488)]

Fixed.

12429 H 313 (10.2 ... 10.9)

R.A. $23^h\ 27^m\ 40^s$: Decl. + 11° 37′

1911.632	280°.6	15″.00
11.665	281.1	14.94
11.670	280.7	15.11
1911.656	280.8	15.02

South preceding BD 11° (5020). No early measures.

12442 H 3202

R.A. $23^h\ 28^m\ 56^s$ Decl. − 19° 14′

1910.851	248°.4	4″.70
10.870	249.4	4.54
10.898	247.2	4.53
1910.873	248.3	4.59

The measures are discordant. No change.

12448 H 3205

R.A. $23^h\ 29^m\ 36^s$ Decl. − 14° 27′

1911.714	58°3	18″73
11.834	60.4	18.73
11.873	59.2	18.91
1911.807	59.3	18.79

No early measures.

12451 H 1894 (9.4 ... 9.5)

R.A. $23^h\ 30^m\ 7^s$ Decl. + 50° 52′

A and B

1912.798	27°8	21″37
12.820	209.4	21.32
12.845	208.8	21.43
1912.821	208.7	21.37

1908.66	207°8	21″15	3n	Bies

[Van Biesbroeck (*Ann. Observ. Belgique*, N. S. XIII)]

No early measures.

B and C (10.0)

1912.798	218°9	37″10
12.820	219.2	36.55
12.845	219.8	36.80
1912.821	219.3	36.82

Not previously measured.

B and D (8.8)

1912.798	180°1	67″00
12.820	180.4	67.12
12.845	180.2	66.97
1912.821	180.2	67.03

No prior measures.

12455 Hu 791

R.A. $23^h\ 30^m\ 27^s$ Decl. + 49° 4′

1911.566	123°4	2″75
11.574	122.2	2.73
11.569	126.0	2.80
11.670	123.3	2.97
1911.595	123.7	2.81

1910.46	124°2	2″64	3n	Do

[Doberck (*A. N.* 4480)]

Probably unchanged.

12457 H 3206

R.A. $23^h\ 30^m\ 46^s$ Decl. − 22° 20′

1910.944	345°8	3″16
10.947	344.4	3.44
11.561	344.9	3.43
11.714	344.3	3.16
1911.292	344.9	3.30

Possibly the angle is decreasing.

12461 Muller 2

R.A. $23^h\ 31^m\ 9^s$ Decl. − 12° 13′

1911.632	303°7	3″21
11.651	304.8	3.38
11.665	302.2	3.43
1911.649	303.6	3.34

No change.

12466 H 315

R.A. $23^h\ 31^m\ 28^s$ Decl. + 11° 56′

1911.563	66°9	20″52
11.577	67.4	20.49
11.591	67.2	20.51
1911.577	67.2	20.51

No early measures.

12467 H 3208

R.A. $23^h\ 31^m\ 35^s$ Decl. + 8° 50′

1911.563	152°0	12″06
11.577	152.0	12.15
11.591	151.9	12.09
1911.577	152.0	12.10

The only measures are of recent date.

12468 OΣ 500

R.A. $23^h\ 31^m\ 40^s$ Decl. + 43° 46′

1912.478	328°4	0″58
14.676	331.1	0.59
1913.577	329.7	0.58

Direct motion.

12475 β 855

R.A. $23^h\ 32^m\ 23^s$ Decl. + 67° 33′

1911.673	203°.9	0″.85
11.777	204.1	0.86
11.785	203.8	0.87
1911.745	203.9	0.86

Apparently fixed.

12479 Σ 3028

R.A. $23^h\ 32^m\ 37^s$ Decl. + 34° 22′

1910.832	201°.8	17″.32
11.495	202.1	17.27
11.498	202.2	17.41
1911.275	202.0	17.33

Slowly decreasing distance.

12487 Comstock

R.A. $23^h\ 33^m\ 18^s$ Decl. + 43° 15′

1911.714	131°.5	4″.16
11.717	135.3	4.11
11.777	134.9	4.11
1911.736	133.9	4.13

1910.72 134°.8 3″.88 2n Lau

[Lau (*A. N.* 4488)]

Apparently unchanged.

12489 H 990

R.A. $23^h\ 33^m\ 32^s$ Decl. − 5° 19′

1911.714	279°.8	40″.93
11.758	279.7	40.94
11.766	279.6	40.94
1911.746	279.7	40.94

Herschel's description is:

1820 + 290° ± 22″ ± 8–9 ... 10

12495 Es 149

R.A. $23^h\ 34^m\ 18^s$ Decl. + 63° 39′

A and B

1909.742	120°.2	5″.73
09.967	117.1	5.58
09.973	118.6	5.80
12.667	120.4	5.62
1910.587	119.1	5.68

No motion.

A and C (11.0)

1909.967	177°.7	50″.66
09.973	176.6	50.46
12.667	177.9	50.49
1910.869	177.4	50.54

No prior measures.

12505 β 857

R.A. $23^h\ 34^m\ 58^s$ Decl. + 66° 53′

1911.673	294°.0	1″.53
11.706	294.8	1.45
11.714	300.4	1.37
1911.698	296.4	1.45

Entirely unchanged.

12506 Σ 3031

R.A. $23^h\ 35^m\ 3^s$ Decl. + 5° 36′

1912.697	312°.0	14″.51
12.708	311.2	14.59
12.727	310.6	14.66
1912.711	311.3	14.59

Fixed.

12508 A 423

R.A. $23^h\ 35^m\ 12^s$ Decl. − 9° 17′

1911.708	169°.0	1″.85
11.758	168.5	1.91
11.766	168.7	1.72
1911.744	168.7	1.83

As yet no change.

12512 H 991 (9.2 ... 9.3)

R.A. $23^h\ 35^m\ 37^s$ Decl. + 21° 47′

A and B

1912.798	346°.4	17″.38
12.823	345.5	17.33
12.836	345.7	17.54
1912.819	345.9	17.42

No early measures for comparison.

A and C (10.5)

1912.798	224°.8	92″.85
12.823	224.7	92.68
1912.810	224.7	92.76

Not previously measured.

12513 H 1901. BD 54° (3024)

R.A. $23^{h}\ 34^{m}\ 51^{s}$ Decl. + 54° 34′

1911.796	255°.7	16″.28
11.823	255.4	16.28
11.826	254.7	16.15
1911.815	255.3	16.24

No early exact measures.

12517 OΣ 503

R.A. $23^{h}\ 35^{m}\ 59^{s}$ Decl. + 19° 38′

1907.720	128°.1	1″.44	12
07.758	128.4	1.60	12
07.766	128.1	1.59	12
1907.748	128.2	1.54	

Little if any relative motion.

12519 H 1902

R.A. $23^{h}\ 36^{m}\ 22^{s}$ Decl. + 59° 5′

1911.796	289°.4	12″.73
11.823	290.7	13.04
11.925	290.4	12.87
1911.848	290.2	12.88

Nothing early except Herschel's estimates.

12522 H 1904

R.A. $23^{h}\ 35^{m}\ 46^{s}$ Decl. + 59° 14′

For measures of this pair see Fox 50, p. 229.

.... SD − 15° (6479) (9.7 ... 10.1)

R.A. $23^{h}\ 37^{m}\ 2^{s}$ Decl. − 15° 45′

1908.829	227°.3	5″.10	12
15.506	227.3	5.48	
1912.168	227.3	5.29	

12534 A. G. 294

R.A. $23^{h}\ 38^{m}\ 14^{s}$ Decl. + 68° 24′

1912.617	122°.6	17″.04
12.628	122.8	17.05
12.667	122.3	17.07
1912.637	122.6	17.05

Faint stars near. No indication of change.

12536 Es 150 (9.5 ... 10.8)

R.A. $23^{h}\ 38^{m}\ 24^{s}$ Decl. + 64° 23′

1912.678	32°.2	3″.47
12.628	31.2	3.38
12.689	30.6	3.65
1912.665	31.3	3.50

1907.82	33°.0	3″.41	3n	β

[β (*Carnegie Inst.* 168)]

Without motion.

12538 H 3211

R.A. $23^{h}\ 38^{m}\ 50^{s}$ Decl. + 3° 6′

1912.697	82°.8	48″.75
12.708	82.9	48.67
12.746	83.0	48,85
1912.717	82.9	48.76

1909.73	83°.0	48″.19	2n	Lau
1910.59	82.8	48.24	3n	β

[Lau (*A. N.* 4488) . . . β (*Carnegie Inst.* 168)]

Change due to proper motion of one or both components.

12541 Hu 300

R.A. $23^{h}\ 39^{m}\ 23^{s}$ Decl. + 5° 49′

1912.697	299°.2	1″.08
12.708	124.5	1.07
12.727	304.4	1.11
1912.711	302.7	1.09

The quadrant is uncertain. No change.

12543 Sh 356. 107 *Aquarii*

R.A. $23^{h}\ 39^{m}\ 47^{s}$ Decl. − 19° 21′

1907.720	137°.7	6″.04	12
07.755	138.9	6.48	12
07.758	138.0	6.12	12
1907.744	138.2	6.21	

Change is still uncertain.

12552 Σ 3039

R.A. $23^{h}\ 40^{m}\ 49^{s}$ Decl. + 27° 45′

1912.746	32°.9	33″.03
12.749	32.8	33.11
12.798	32.0	33.12
1912.764	32.6	33.09

Change due to proper motion.

12561 β 390

R.A. $23^{h}\ 41^{m}\ 33^{s}$ Decl. $+\ 48°\ 38'$

1912.798	232°.8	16″.93(a)
12.877	234.0	16.81(a)
12.913	234.4	16.99
1912.863	233.7	16.91

(a) B very faint.

Change in distance is probable.

12593 H 3220

R.A. $23^{h}\ 45^{m}\ 15^{s}$ Decl. $+\ 1°\ 45'$

1912.749	17°.5	33″.02
12.790	197.2	32.97
12.798	197.7	32.87
1912.779	197.5	32.95

The distance is increasing.

12601 Σ 3042. *Andromedae* 28

R.A. $23^{h}\ 45^{m}\ 51^{s}$ Decl. $+\ 37°\ 14'$

1912.812	266°.4	5″.13
12.823	88.1	4.99
12.839	89.1	5.13
1912.825	87.9	5.08

1910.77	88°.0	4″.82	4n	Bu–And

[Buch-Anderson (*A. N.* 4488)]

Change in distance is indicated.

12613 Σ 3044

R.A. $23^{h}\ 46^{m}\ 51^{s}$ Decl. $+\ 11°\ 16'$

1907.720	281°.4	19″.02	12
07.755	281.5	19.22	12
07.758	282.4	19.26	12
1907.744	281.8	19.17	

Without change.

12623 B. A. C. 8308

R.A. $23^{h}\ 48^{m}\ 9^{s}$ Decl. $-\ 27°\ 43'$

1907.720	268°.4	6″.75	12
07.766	267.9	6.90	12
07.777	269.2	6.80	12
1907.754	268.5	6.82	

No change since 1835.

12625 Σ 3045

R.A. $23^{h}\ 48^{m}\ 17^{s}$ Decl. $+\ 1°\ 48'$

1912.839	265°.3	1″.83
12.880	267.4	1.62
12.883	265.6	1.71
1912.867	266.1	1.72

No appreciable motion.

12635 A. G. 296

R.A. $23^{h}\ 49^{m}\ 37^{s}$ Decl. $+\ 37°\ 50'$

1912.798	54°.4	5″.58
12.812	52.8	5.73
12.823	53.2	5.58
1912.811	53.5	5.63

The measures of distance are discordant but no change is indicated.

12636 A 425

R.A. $23^{h}\ 49^{m}\ 56^{s}$ Decl. $+\ 27°\ 35'$

1912.812	154°.6	1″.84
12.823	157.8	1.82
12.839	158.5	1.77
1912.825	157.0	1.81

Aitken gives the following:

1902.81	162°.8	1″.54	3n

12639 Σ 3046

R.A. $23^{h}\ 50^{m}\ 15^{s}$ Decl. $-\ 10°\ 10'$

1912.708	251°.7	3″.35
12.727	251.4	3.37
12.746	251.3	3.34
12.749	251.4	3.44
1912.732	251.4	3.37

Both angle and distance are increasing.

12646 Hu 98

R.A. $23^{h}\ 50^{m}\ 57^{s}$ Decl. $-\ 13°\ 38'$

1912.708	126°.0	1″.63
12.727	123.3	1.39
12.823	124.1	1.75
1912.753	124.5	1.59

No motion since the original observations of 1899.

12648 A. G. 297

R.A. $23^h\,51^m\,7^s$ Decl. $+37^\circ\,11'$

1912.798	306°.9	2″.21
12.812	311.4	1.99
12.823	309.4	2.03
1912.811	309.2	2.08

Apparently fixed.

12655 Σ 3047. BD 56° (3120)

R.A. $23^h\,51^m\,50^s$ Decl. $+56^\circ\,43'$

A and B

1912.730	66°.7	1″.18
12.784	76.1	1.16
12.801	65.0	1.18
12.875	67.0	1.03
1912.797	68.7	1.14

Without motion.

A and C

1912.730	191°.0	7″.82
12.784	190.1	7.89
12.875	190.1	7.87
1912.796	190.4	7.86

Probably unchanged.

12671 Doo 22 = Es 112

R.A. $23^h\,53^m\,7^s$ Decl. $+52^\circ\,49'$

1911.561	225°.2	1″.42
11.574	219.0	1.45
11.577	222.4	1.62
1911.571	222.2	1.50

So far no motion.

12707 Es 39 = Arg. 47

R.A. $23^h\,56^m\,36^s$ Decl. $+59^\circ\,17'$

1910.758	290°.1	10″.22
10.777	290.1	10.17
10.895	289.3	10.05
1910.810	289.8	10.15

No indication of motion.

.... BD 25° (5068) (6.2 ... 10.8)

R.A. $23^h\,57^m\,45^s$ Decl. $+25^\circ\,59'$

1907.720	122°.6	22″.91	12
07.755	122.0	23.33	12
07.758	122.4	23.04	12
1907.744	122.3	23.09	

Fox 1. BD 12° (15) (9.2 ... 12.0)

R.A. $0^h\ 11^m\ 0^s$ Decl. + 12° 29′

1911.766	110°.7	4″.29
12.823	108.4	4.02
12.836	110.0	4.24
1912.475	109.7	4.18

np **120** = H 3.

2. Anon. (10.3 ... 10.5)

R.A. $0^h\ 16^m\ 51^s$ Decl. + 59° 50′

1915.640	154°.8	4″.07
15.665	155.2	4.13
15.667	154.8	4.29
1915.657	154.9	4.16

27^s *p* and 84″ *s* of BD 59° (48). Found in seeking **149** = H 1019.

3. BD 79° (27) (9.4 ... 12.0)

R.A. $0^h\ 57^m\ 0^s$ Decl. + 79° 28′

1915.640	145°.4	4″.16
15.665	150.2	4.14
1915.653	147.8	4.15

4. Anon. (9.4 ... 10.4)

R.A. $3^h\ 13^m\ 59^s$ Decl. + 58° 42′

1912.727	4°.5	2″.92
12.730	4.3	2.91
12.757	1.5	2.95
1912.738	3.4	2.93

This pair is 29^s *f* and 132″.8 *n* of BD 58° (593). It is *sp* **1680** = Es 53.

5. BD 68° (304) (10.3 ... 10.7)

R.A. $3^h\ 56^m\ 56^s$ Decl. + 68° 46′

1909.898	333°.2	2″.85
09.967	333.0	2.60
10.109	332.3	2.48
1909.991	332.8	2.64

p **2036** = H 1141.

6. SD − 9° (848) (9.5 ... 10.0)

R.A. $4^h\ 7^m\ 31^s$ Decl. − 9° 53′

1911.059	2°.6	2″.27
11.062	2.1	2.26
11.095	2.0	2.43
1911.072	2.2	2.32

South of **2085** = H 3626.

7. SD − 3° (1125) (9.5 ... 11.0)

R.A. $5^h\ 23^m\ 39^s$ Decl. − 3° 33′

1914.088	42°.2	2″.30
14.107	42.4	2.73
14.904	46.1	2.85
1914.366	43.6	2.63

Duplicity detected on a photographic plate made with the 18½-inch refractor.

8. Anon. (10.2 ... 10.5)

R.A. $6^h\ 7^m\ 8^s$ Decl. − 0° 55′

1910.969	334°.0	4″.97
11.988	335.4	4.72
12.828	334.0	4.57
1911.928	334.5	4.79

This star is not in BD but is 35^s *f* and 21″ *n* of BD − 1° (1146) = **3225**. It is possibly identical with Jonckheere 340. The descriptions are similar.

9. BD 21° (1184) (9.5 ... 9.8)

R.A. $6^h\ 10^m\ 52^s$ Decl. + 21° 53′

1911.823	175°.8	5″.00
11.832	176.7	5.10
11.851	177.2	5.09
1911.835	176.6	5.06

This pair is *np* **3297** = A. G. 109.

10. Anon. (10.1 ... 10.9)

R.A. $6^h\ 11^m\ 32^s$ Decl. − 4° 14′

1911.810	315°.0	2″.02
11.837	315.6	1.96
11.851	315.5	1.97
1911.833	315.4	1.98

16^s *p* and 2′.5 *s* of β G. C. **3285** = H 2310.

11. BD 23° (1459) (9.9 ... 11.0)

R.A. $6^h\ 34^m\ 8^s$ Decl. + 23° 43′

B and C

1914.088	181°0	1″71
14.123	186.4	1.66
1914.105	183.7	1.68

A and B (9.1 ... 9.9)

1914.088	25°7	18″46
14.123	25.7	18.49
1914.105	25.7	18.47

The duplicity of BC was detected on one of the photographic plates made with the 18½-inch.

12. SD − 19° (1757) (9.9 ... 10.9)

R.A. $7^h\ 8^m\ 1^s$ Decl. − 19° 49′

1910.200	257°6	3″46
10.211	255.9	3.78
10.994	256.4	4.05
11.188	255.1	4.04
1910.648	256.2	3.83

A faint pair *sf* **3910** = Hn 85.

13. BD 26° (1747)

R.A. $8^h\ 6^m\ 25^s$ Decl. + 26° 5′

A and B

1914.904	147°9	1″81
15.068	335.3	1.60
1914.986	151.6	1.70

A and B are of equal magnitude.

A and C = **4487** H 441

1914.904	67°8	21″87
15.068	66.2	21.87

In reversing the angle of AB, C has been measured from A in the first case and from B in the second. No early measures of AC for comparison.

14. Anon. (10.7 ... 11.0)

R.A. $10^h\ 8^m\ 56^s$ Decl. + 25° 40′

1909.060	186°7	3″46	40
10.178	184.1	3.07	
12.185	183.1	3.21	
1910.474	184.6	3.25	

This faint pair found with the 40-inch in searching for H 477 is *nf* BD 25° (2222).

15. SD − 1° (2789) (9.4 ... 11.8)

R.A. $13^h\ 7^m\ 50^s$ Decl. − 1° 26′

1910.181	150°0	2″26
10.200	150.8	2.15
10.246	149.4	2.12
12.308	154.9	2.36
13.288	151.5	2.55
13.444	157.7	2.30
1910.188	150.1	2.18
1913.013	154.7	2.40

Found and measured twice, first in searching for **6423** = Σ 1731 and again in locating **13243** = A 684.

16. SD − 18° (3954) (11.0 ... 11.5)

R.A. $14^h\ 55^m\ 33^s$ Decl. − 19° 6′

A and B

1909.246	108°3	1″85	40
09.312	110.3	1.85	40
09.331	110.4	1.88	40
1909.296	109.7	1.86	

Found with the 40-inch.

A and C (9.1)

1909.246	234°5	50″07	40
09.312	235.0	50.23	40
09.331	234.6	49.93	40
1909.296	234.7	50.08	

nf **7094** = Hn 22. It is the star C which is SD − 18° (3954).

17. Anon. (9.9 ... 11.7)

R.A. $16^h\ 21^m\ 5^s$ Decl. + 64° 33′

1910.236	171°7	3″53
10.274	172.6	3.37
10.427	171.5	3.47
1910.312	171.9	3.46

75^s *f* and 34″ *s* of **7623** = Σ 2046.

18. SD − 15° (4479) (10.1 ... 10.2)

R.A. $17^h\ 5^m\ 8^s$ Decl. − 15° 39′

A and B

1908.583	47°1	1″94	40
08.604	225.7	2.07	40
08.616	45.0	2.00	40
1908.601	45.9	2.00	

A and C

1908.583	.....	115″.84	40
08.604	336°.9	......	40

C and D (10.5 ... 11.7)

1908.583	249°.5	13″.43	40
08.604	250.6	13.41	40
08.616	249.8	13.81	40
1908.601	250.0	13.55	

Found with the 40-inch.

19. SD − 15° (4494) (9.8 ... 9.8)

R.A. $17^{h}\ 8^{m}\ 45^{s}$ Decl. − 15° 49′

1908.507	112°.8	0″.91	40
08.564	301.1	0.94	40
08.583	124.0	1.01	40
1908.551	122.6	0.95	

Found with the 12-inch.

20. SD − 14° (4708) (9.5 ... 10.2)

R.A. $17^{h}\ 31^{m}\ 37^{s}$ Decl. − 15° 0′

1908.518	328°.1	....	12
08.545	330.0	....	40
08.564	329.2	1″.86	40
08.583	330.5	1.49	40
1908.552	329.4	1.44	

21. Anon. (10.5 ... 11.8)

R.A. $17^{h}\ 39^{m}\ 31^{s}$ Decl. − 15° 24′

1908.644	317°.2	3″.47	40
08.660	317.5	3.43	40
1908.652	317.3	3.45	

$5^{s}.5$ *p* and 191″.4 *s* of SD − 15° (4674). Found with the 12-inch.

22. BD 15° (3286) (9.7 ... 10.1)

R.A. $17^{h}\ 45^{m}\ 15^{s}$ Decl. + 15° 20′

1911.489	337°.7	0″.67
11.547	336.0	0.65
12.412	337.1	0.81
1911.816	336.9	0.71

This pair may possibly be Lewis 16. If so, there has been decided change if the early measures were accurate.

23. Anon. (10.6 ... 11.2)

R.A. $17^{h}\ 45^{m}\ 16^{s}$ Decl. − 15° 32′

A and B

1908.644	224°.7	2″.86	40
08.660	229.1	2.06	40
1908.652	226.9	2.46	

$13^{s}.5$ *f* and 267″.9 *s* of SD − 15° (4702). Found with the 12-inch.

A and C (11.3)

1908.636	348°.2	5″.25	12
08.644	347.3	4.70	40
08.660	346.5	4.73	40
1908.644	347.3	4.89	

24. CPD − 24° (6154) (8.8 ... 10.4)

R.A. $17^{h}\ 56^{m}\ 54^{s}$ Decl. − 24° 15′

1910.523	19°.0	3″.99
10.529	18.4	4.08
12.349	21.2	4.05
1911.134	19.5	4.04

North of the cluster M 8.

25. BD 28° (3044) (9.6 ... 10.2)

R.A. $18^{h}\ 34^{m}\ 10^{s}$ Decl. + 28° 41′

1914.611	249°.4	1″.19
14.613	252.3	1.16
15.574	252.2	1.27
1914.933	251.3	1.21

Found on a photographic plate made with the 18½-inch. *nf* **8701** = Σ 2356.

26. BD 54° (2105) (9.4 ... 12.3)

R.A. $19^{h}\ 10^{m}\ 37^{s}$ Decl. + 54° 54′

1908.755	131°.2	2″.02	40
09.331	127.7	2.11	40
11.462	127.1	2.02	
1909.849	128.7	2.05	

This pair is *sf* **9150** = Hn 34.

A and C (11)

1908.755	345°.5	17″.30	40
09.331	344.8	17.20	40
1909.043	345.2	17.25	

27. BD 36° (3529) (8.5 ... 12.5)

R.A. $19^h\ 18^m\ 42^s$ Decl. + 37° 1′

1909.367	177°.1	3″.90	40
11.577	176.3	4.14	
11.621	176.9	4.16	
1910.855	176.8	4.07	

np **9304** = H 1395.

28. SD − 19° (5518) (9.5 ... 10.2)

R.A. $19^h\ 29^m\ 15^s$ Decl. − 19° 20′

1911.717	262°.4	3″.58
13.447	261.1	3.41
13.485	262.0	3.38
1912.883	261.8	3.46

sp **9402** = H 2881.

29. BD 41° (3438) (10.0 ... 10.8)

R.A. $19^h\ 35^m\ 30^s$ Decl. + 41° 22′

A and B

1915.604	47°.4	42″.44
15.618	47.1	42.50
15.640	47.2	42.74
1915.621	47.2	42.56

B and C (11.5)

1915.604	80°.2	1″.18
15.618	88.0	1.23
15.665	82.4	1.25
1915.629	83.5	1.22

There are faint stars nearer to A than are B and C.

30. BD 41° (3450) (10 ... 13.2)

R.A. $19^h\ 37^m\ 14^s$ Decl. + 41° 9′

A and B

1912.691	29°.0	7″.30
15.593	31.3	7.36
15.604	30.0	7.49
1914.629	30.1	7.38

This fainter, closer companion was detected with the 18½-inch.

A and C (10) = **9526** H 1431

1911.728	157°.4	13″.88
11.823	159.5	13.98
12.691	157.9	13.88
1912.081	158.3	13.91

Herschel's description is:

1828 +	340°.6	12″ ±	10 ... 10

31. BD 6° (4323) (8.6 ... 12.8)

R.A. $19^h\ 43^m\ 48^s$ Decl. + 7° 0′

1913.447	15°.1	4″.51
15.509	12.7	4.84
15.599	13.2	4.84
1914.852	13.7	4.73

np **9652** = A. G. 238.

32. BD 1° (4203) (9.8 ... 10.2)

R.A. $20^h\ 0^m\ 45^s$ Decl. + 1° 37′

A and B

1910.722	217°.3	0″.45
11.629	223.3	0.61
1911.175	220.3	0.53

A and C (9.7 ... 10.0)

1910.529	3°.2	29″.25
10.722	3.8	29.28
10.733	3.5	29.20
1910.661	3.5	29.24

This group is *sf* **9899** = H 902.

33. BD 25° (4127) (9.1 ... 10.5)

R.A. $20^h\ 5^m\ 9^s$ Decl. + 25° 15′

1912.579	99°.2	1″.03
12.587	100.1	1.20
12.593	101.6	1.12
1912.586	100.3	1.12

This is *sp* **9990** = Doo 14.

34. BD 49° (3229) (9.2 ... 11.0)

R.A. $20^h\ 9^m\ 45^s$ Decl. + 49° 26′

1910.416	183°.9	4″.96
10.449	182.8	4.85
10.493	183.5	4.93
1910.453	183.4	4.91

Follows **9910** = Ku 58. There is a star (13.0) 22″ *np*.

35. BD 26° (3841) (9.3 ... 11.0)

R.A. $20^h\ 10^m\ 13^s$ Decl. + 26° 22′

1912.500	247°.9	1″.93
12.568	245.3	1.80
12.686	243.7	1.90
1912.585	245.6	1.88

This pair is *np* **10072** = β 984.

36. Anon. (9.9 ... 10.4)

R.A. $20^h\ 21^m\ 16^s$ Decl. + 37° 21′

1911.717	326°.9	2″.67
11.777	326.3	2.73
11.788	327.1	2.76
1911.761	326.8	2.72

This pair is *np* **10222** = A. G. 255. 6′ *n* of BD 37° (3930).

37. BD 12° (4380) (9.4 ... 9.8)

R.A. $20^h\ 28^m\ 21^s$ Decl. + 13° 1′

1913.507	54°.2	1″.38
13.677	55.8	1.36
13.680	55.2	1.28
1913.621	55.1	1.34

sf **10310** = β 670.

38. Anon. (10.7 ... 11.5)

R.A. $20^h\ 35^m\ 13^s$ Decl. + 56° 4′

1912.768	295°.0	4″.75
12.820	295.6	4.67
12.877	296.2	4.96
1912.822	295.6	4.79

This faint pair is 6′ *s* of BD 56° (2458). *sp* **13540** = A 745.

39. β G. C. **10059**

R.A. $20^h\ 11^m\ 38^s$ Decl. + 43° 17′

C and D (10.0 ... 12.8)

1915.629	133°.6	1″.24
15.654	135.4	1.29
15.667	132.4	1.25
1915.650	133.8	1.26

C and E (13.0)

1915.629	55°.3	5″.61
15.654	57.2	5.86
1915.641	56.3	5.73

A and B = Σ 2659

1914.460	314°.1	3″.18
14.550	313.9	3.09
15.629	313.6	3.12
1914.880	313.9	3.13

Fixed.

A and C

1914.460	252°.4	20″.55
14.550	252.8	20.88
15.629	252.4	20.55
1914.880	252.5	20.66

Fixed.

40. Anon. (9.6 ... 10.0)

R.A. $20^h\ 12^m\ 28^s$ Decl. + 43° 16′

1915.629	30°.5	1″.71
15.640	25.8	1.46
15.648	30.7	1.63
1915.639	29.0	1.60

$1^s.5$ *p* and 134″.8 *n* of BD 43° (3549).

41. BD 36° (4461)

R.A. $21^h\ 7^m\ 42^s$ Decl. + 36° 50′

B and C (10.6 ... 11.0)

1911.717	131°.0	0″.79
12.801	127.5	0.84
1912.259	129.2	0.82

A (9.8) and BC = **10820** H 1623

1911.717	151°.4	15″.88
11.777	151.1	15.85
11.788	150.7	.....
12.434	150.0	15.76
12.801	151.5	15.42
1912.103	150.9	15.73

It is the star A which is BD 36° (4461). Herschel's description is:

1829 +	332°.3	10″ ±	10 ... 10

42. Anon. (10.0 ... 10.4)

R.A. 21ʰ 11ᵐ 0ˢ Decl. − 21° 49′

1911.629	101°.5	2″.03
11.634	107.1	1.97
11.673	102.9	1.97
1911.645	103.8	1.99

7ˢ *p* and 245″ *s* of SD − 21° (5981).

43. Anon. (10.0 ... 10.3)

R.A. 21ʰ 34ᵐ 2ˢ Decl. + 50° 14′

1911.495	79°.3	2″.63
11.498	82.8	2.86
11.500	83.1	2.80
1911.498	81.7	2.76

62ˢ *f* and 23″.7 *s* of **11123** = H 1671.

44. Anon. (10.1 ... 10.5)

R.A. 22ʰ 5ᵐ 45ˢ Decl. + 63° 25′

1911.621	312°.6	3″.44
11.706	308.0	3.35
12.680	311.7	3.26
1912.002	310.8	3.35

South of **11551**. Midway between BD 63° (1812) and (1815).

45. CPD − 23° (8125) (9.5 ... 11.0)

R.A. 22ʰ 7ᵐ 22ˢ Decl. − 23° 44′

A and B

1910.753	147°.7	4″.36
11.634	149.1	4.56
15.599	150.5	4.47
1912.662	149.1	4.46

sp **11603** = Ho 472.

A and C (11.7)

1911.634	81°.7	30″.33
15.599	82.2	30.33
1913.617	82.0	30.33

46. BD 70° (1241) (9.1 ... 10.4)

R.A. 22ʰ 23ᵐ 46ˢ Decl. + 70° 23′

1911.667	128°.6	4″.87
11.673	129.2	4.90
11.708	131.0	5.00
1911.683	129.6	4.92

nf **11762** = A 783.

47. BD 9° (5196) (9.1 ... 10.3)

R.A. 23ʰ 11ᵐ 54ˢ Decl. + 9° 48′

1910.518	280°.4	4″.84
10.523	280.7	4.85
10.529	280.7	4.90
1910.523	280.6	4.86

sf **12223** = H 3177.

48. SD − 9° (6213) (9.5 ... 11.7)

R.A. 23ʰ 27ᵐ 21ˢ Decl. − 9° 1′

1912.823	7°.4	1″.81
15.708	7.9	1.87
1914.265	7.6	1.84

49. BD 67° (1543) (9.3 ... 11.6)

R.A. 23ʰ 31ᵐ 7ˢ Decl. + 67° 33′

1911.777	178°.2	2″.92
12.730	175.2	2.83
1912.253	176.7	2.87

p **12475** = β 855.

50. BD 59° (2759) (10.5 ... 13.0)

R.A. 23ʰ 35ᵐ 46ˢ Decl. + 59° 14′

A and B

1915.665	263°.0	8″.00
15.667	264.6	8.67
1915.666	263.8	8.33

A and C (10.5 ... 11.5) = **12522** H 1904

1911.796	116°.1	14″.59
11.823	116.7	14.35
1911.809	116.4	14.47

Herschel's description is:

1828 +	111°.0	9″ ±	10 ... 11

Van Biesbroeck failed to find **12522**. (*Ann. Observ. Belgique*, N. S. XIII.)

51. Anon. (10.3 ... 11.6)

R.A. $23^h\ 37^m\ 0^s$ Decl. + 59° 17′

1915.596	297°.7	1″.74
15.640	300.2	1.63
15.665	300.3	1.77
1915.634	299.4	1.71

23^s *p* and 19″ *n* of BD 59° (2761).

52. BD 56° (3133) (9.1 ... 9.4)

R.A. $23^h\ 56^m\ 4^s$ Decl. + 56° 36′

1912.730	135°.7	2″.12
12.784	135.0	2.14
12.875	136.9	2.27
1912.796	135.9	2.18

sf **12655** = Σ 3047.

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